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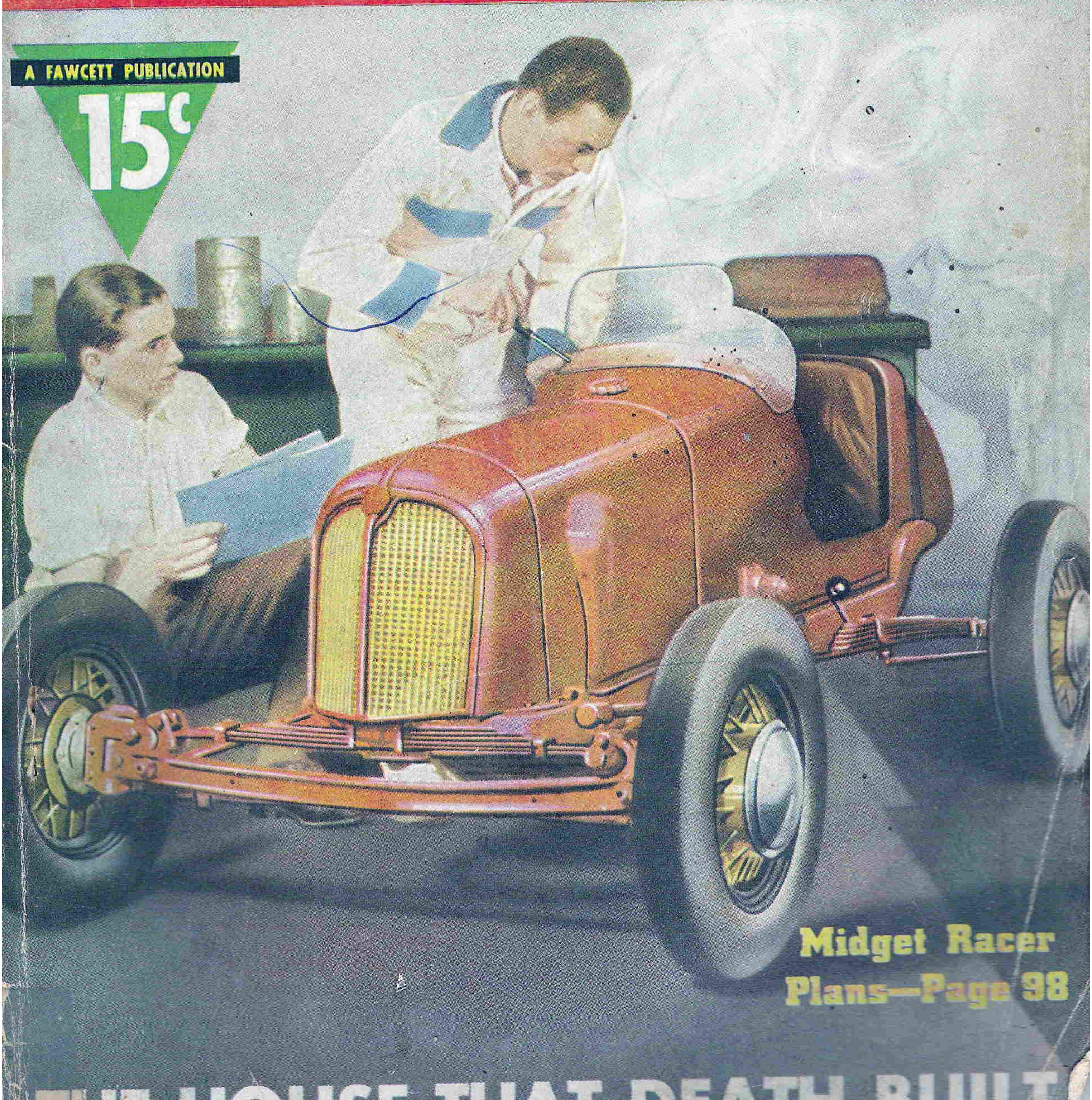

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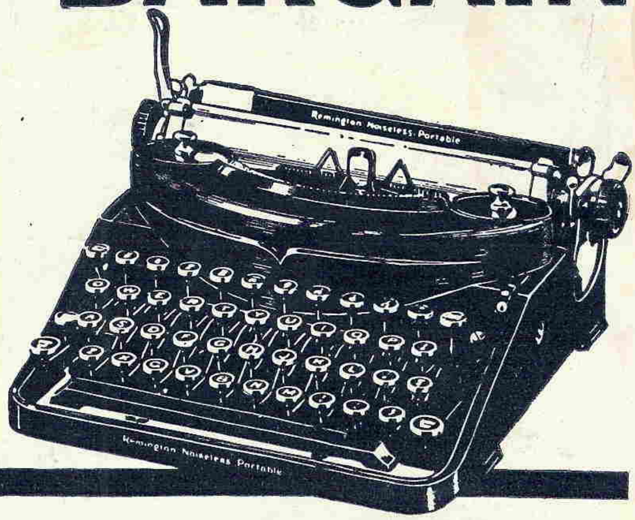

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JUNE
1937

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NEXT MONTH

America spends more than $5,000,000 each year to express patriotic and religious fervor by means of colorful and noisy fireworks. The pyrotechnic industry is a growing one, and its products are finding many new uses. Read about it in the article "Fireworks for Festivals," which will appear in our July issue.

FOR ALL HOBBYISTS

The July issue will also contain an enlarged photography department offering many valuable suggestions and ideas to camera fans; new and timely kinks for car owners; and constructional data on a large Oudin Coil that produces "home-made lightning," a midget superheterodyne, a utility desk, a motorized bicycle, a beautiful gas model plane, and many other items of interest.

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INVENTORS

TO BE successful as an inventor, you don't need to be an Edison who took out 1099 Patents before he died, or a C. F. Kettering, who helped develop the Self-Starter, Duco, Ethyl Gas, and other outstanding inventions, and is today the famous head of the Research Division of the General Motors Corporation. In fact, you don't need to be known as an inventor at all, if you have a practical, useful, salable invention—or an idea for one—**and go about it right.**

Remember that for every Edison or Kettering, for every McCormick, DeForest or Atwater Kent—there have been thousands of unknown men whose inventions helped along the wheels of progress and helped the inventors financially at the same time.

Many Little Ideas Have Big Commercial Possibilities

For example, who knows the name of the inventor of the wooden golf tee, the ordinary crinkly hair pin, or the metal ball or disc that the average housewife uses for scouring pots and pans? Who knows the inventor of the thousands of gadgets that you will find in the ten-cent stores, in the modern drug and department stores? Some day, stop and look at some of the simple articles you'll find on the counters of a ten-cent store. Notice how many of them are marked Patented or Patent Applied For. It is an interesting, educational experiment. These inventors, most of them, weren't of the genius class. They simply got an idea for doing something in a better, easier, faster, or more economical way—AND THEN DID SOMETHING ABOUT IT.

Interesting Points

Who is today's "champion inventor"?

Ans.: John F. O'Connor, of Chicago, Ill., holds 949 Patents, more than any other living man.

Who is "Lady Edison"?

Ans.: Miss Beulah Louise Henry of New York City leads all women inventors, holds fifty patents; is known as "Lady Edison".

What is an improvement?

Ans.: Nearly all inventions today are improvements over earlier inventions. Often the improvement proves more profitable than the earlier invention.

Is a model necessary?

Ans.: Today, most inventions are patented without models. A subject fully explained in our book.

What is the preliminary search?

Ans.: The preliminary search is ordinarily the first step to help an inventor. Also fully explained in our book. Send for a copy today.

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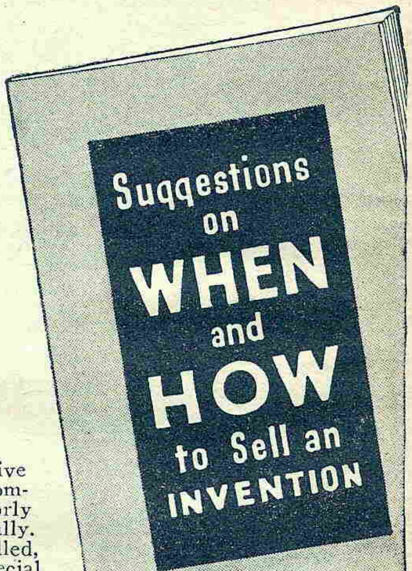

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NOTE ★ ★

You may not be an Edison or a Kettering but still you may have a good idea

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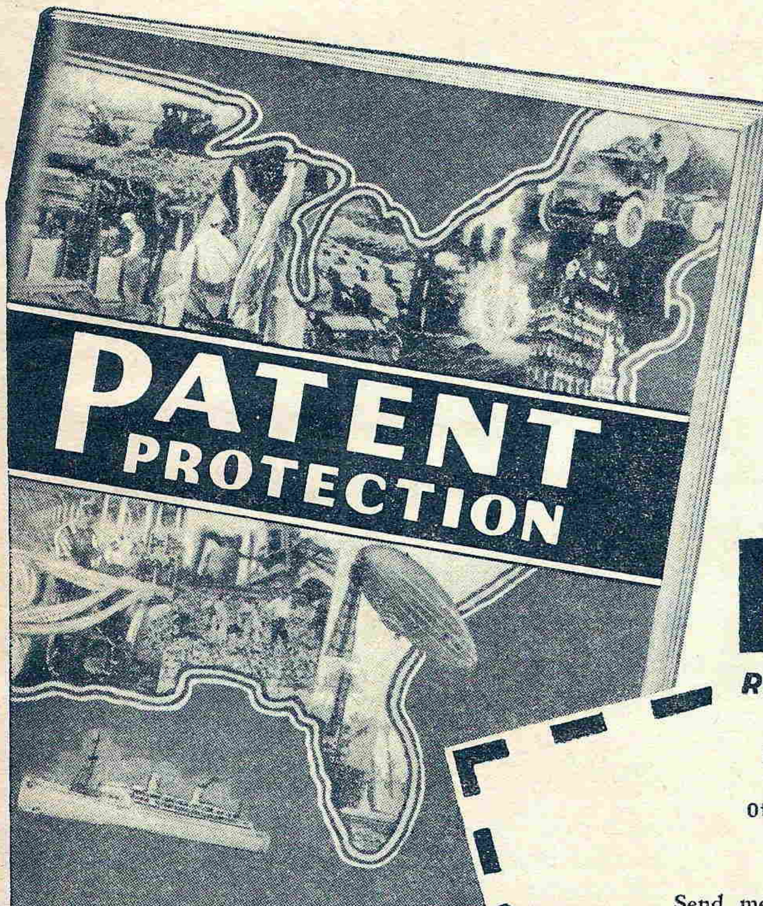

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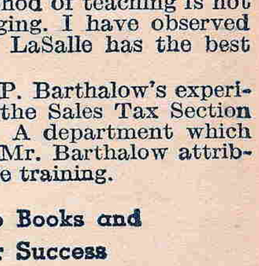

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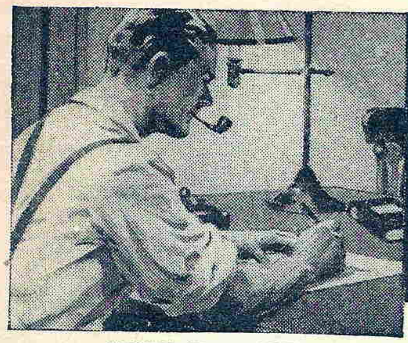

STEP NO. ONE
Make a rough pencil sketch of your invention, describe it fully, and send it to us for preliminary search through United States Patents in the U. S. Patent Office.

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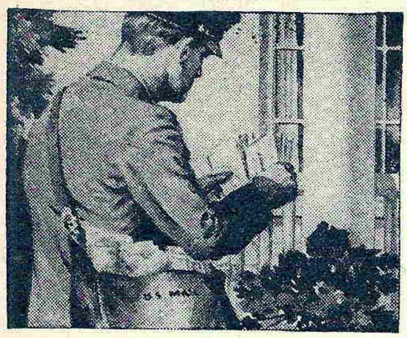

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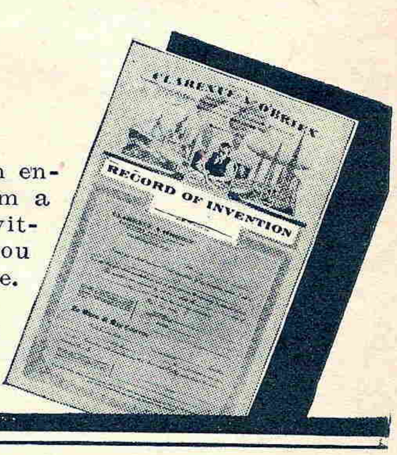

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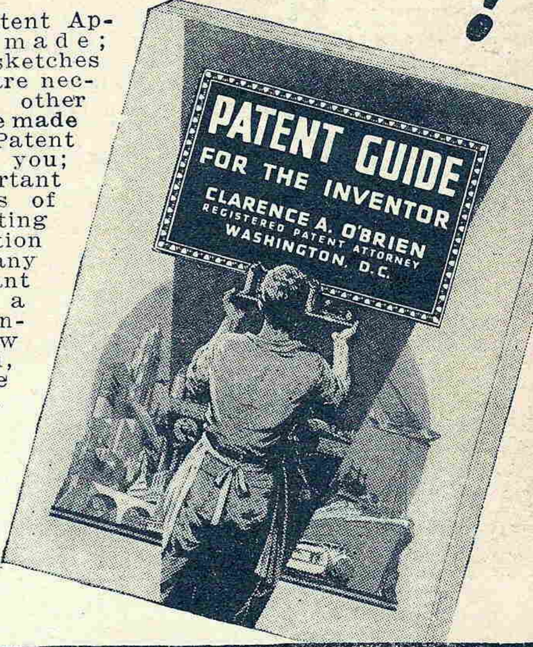

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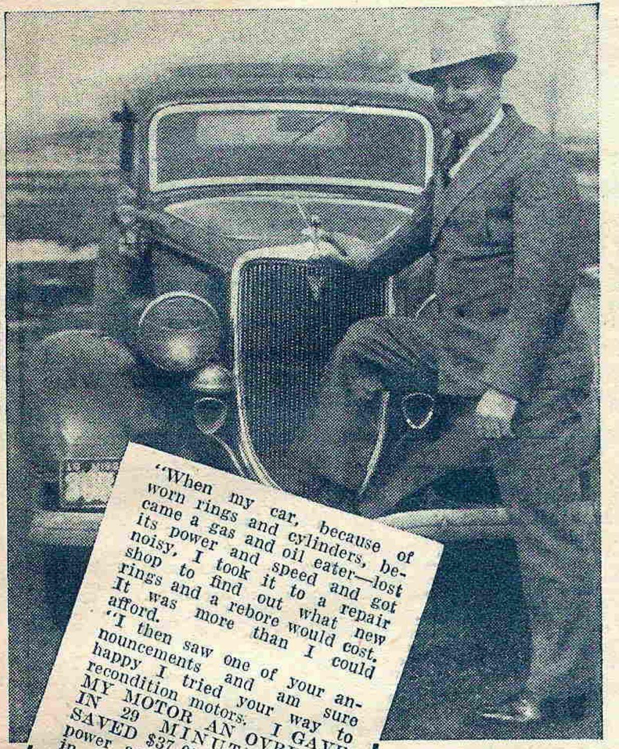

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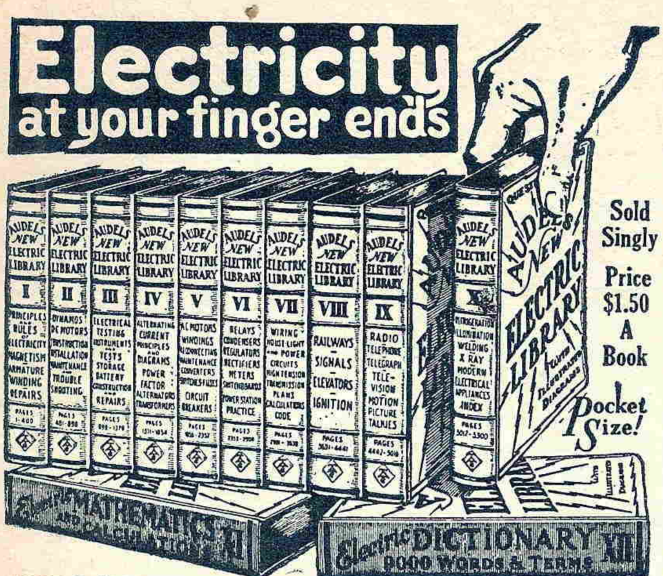
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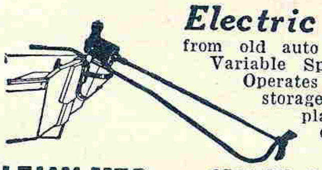

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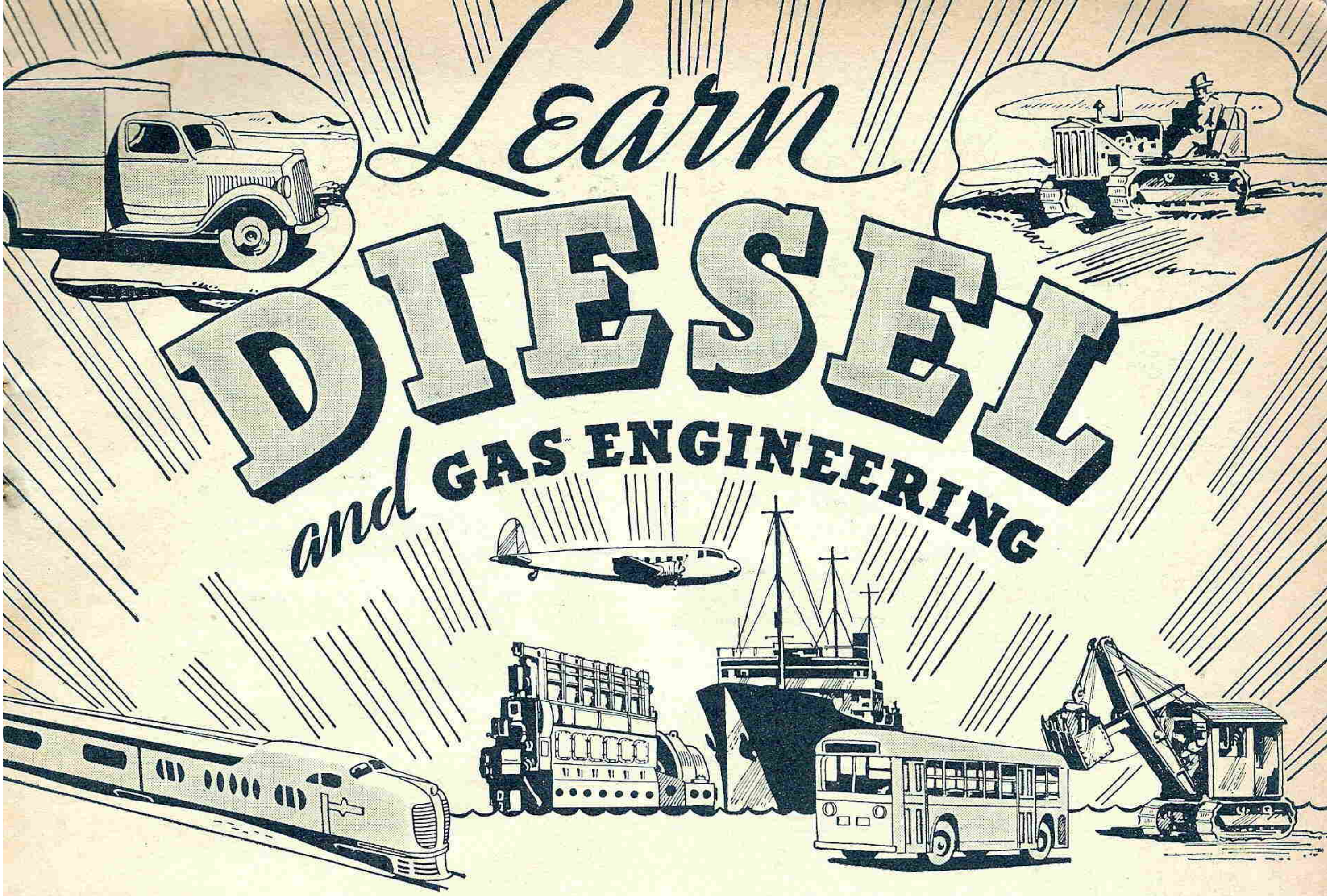

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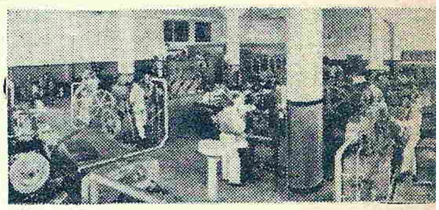
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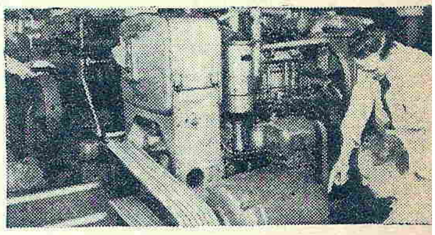
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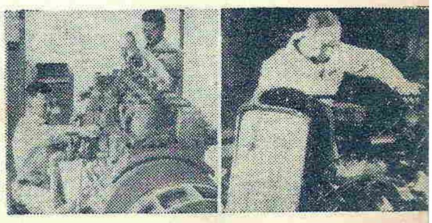
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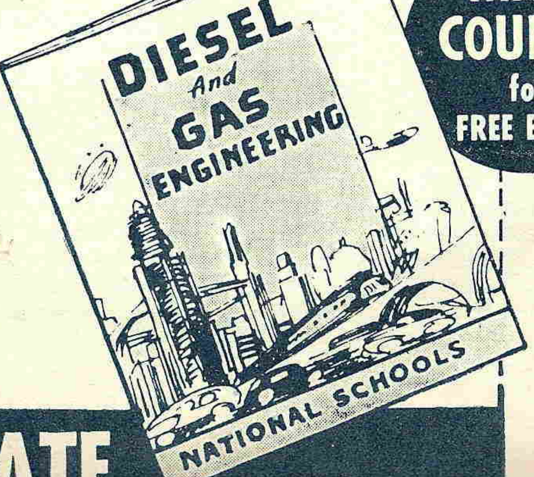

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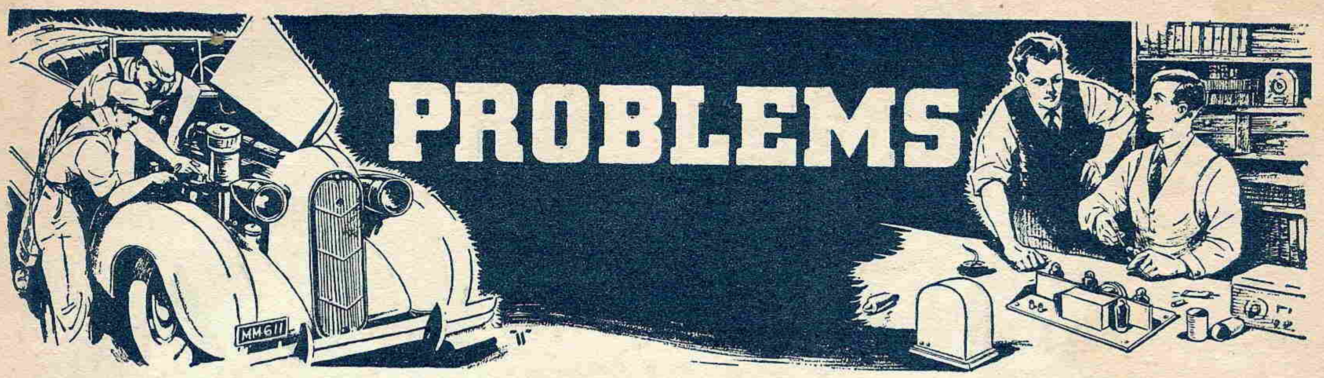

PROBLEMS

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CAR GENERATOR PRODUCES ERRATIC CHARGE

The ammeter on my 1936 car acts very queerly. While driving along at a uniform speed the ammeter shows a charging rate of 15 ampers for a few minutes, then drops to zero and gradually climbs to 15 amperes only to drop off again to zero. Can you tell me the possible cause of its erratic action?—Edward Nutaitis, Detroit, Mich.

The strange action of the ammeter in your car is, no doubt, due to the variable brush in the generator being loose. Remove the metal band around the generator housing while the car is running and shake the brush holder to determine whether or not it is loose. If so, adjust to a charging rate of about 10 amperes and tighten the set-screw on the side of the generator housing. If your car is fitted with a radio, advance the charging rate to 15 amperes to compensate for the added battery drain. Worn brushes will produce a similar effect and in the event that the variable brush is not loose it is advisable to replace all three generator brushes at once.

DETERMINING PITCH OF PROPELLERS

I am constructing a wind driven car and at the present time am experiencing some difficulty in determining the pitch of the propeller to be used with the craft. Can you offer any advice on how the pitch is determined?—Edward A. Lock, Bowers, Delaware.

The empirical rule followed in designing propellers is that the diameter should be as large as possible compatible with the limits of the design. The blade area should be about 15% of that of the area of the revolving sweep of the blades. The pitch should be approximately 4/5 of the diameter with the speed of rotation about 1,800 r.p.m. As the speed of rotation is increased the diameter must be reduced. To obtain maximum thrust the propeller should have a large diameter and low speed of revolution.

A detailed form letter on propeller construction has been prepared and copies can be obtained from the Problems Editor upon receipt of a 3c stamp.

AUTO RADIO FAILS TO FUNCTION IN CAR

I have installed in my 1935 coach, an auto radio that has given me no end of trouble. I have taken the set to radio servicemen on several occasions and while it plays perfectly on the workbench, results are anything but satisfactory once it has been replaced in the car. Only one or two stations can be received and these with very little volume. In addition to this, the ignition noises of the car are so loud that they drowned out most of the reception the set does pick up. To what might this trouble be attributed?—Herbert Popp, Black River Falls, Wis.

If the receiver works quite well in the serviceman's shop the difficulties you mention can be traced to the installation. The fact that the set functions when not in the car indicates that the car antenna is grounded at some point or shielded to such an extent that only motor noises are picked up. If your car has a metal top the antenna used with the set should be either a "fishpole" or running board type, mounted as far from the body of the car as possible. If you are not familiar with the operation of a radio receiver, have your serviceman check the car antenna for grounds and replace the present antenna with a new one if necessary. If, after replacing the old antenna, you are still bothered with some ignition noises, install an antenna noise filter between the set and car antenna to reduce this annoyance. We assume, of course, that you are using spark plug suppressors.

SOLDERING RING WITHOUT DAMAGING JEWEL

I wish to solder a small gold ring which has broken near the jewel mounting. I am afraid to apply the soldering iron to the metal since it may damage the stone. Is there any method whereby the ring can be soldered without danger of the heat harming the jewel?—Danial O'Harra, Boston, Mass.

The usual method used by jewelers, when soldering broken ring bands, so as to prevent damage to stones, is to place them in a small crucible containing wet sand. Bury all of the ring except the part to be soldered and make the repair with soft gold solder. The heat of the iron will be absorbed by the surrounding sand so that it will not be transmitted to the ring mounting.

MAKING POWER DRILL FROM AUTO GENERATOR

Is it possible to convert an auto generator into a 110-volt power drill? I have heard remarks that a drill constructed from an auto generator usually gets very hot and fails to produce the torque required for drilling thick metals. Are these remarks true?—George F. O'Brien, Dorchester, Mass.

An automobile generator can be converted into a 110-volt electric drill by connecting all field coils in series and connecting the leads to the 110-volt supply. One stationary brush and the adjustable brush are connected

[*Continued on page* 18]

A FEW WEEKS AGO
NEVER DID CARE FOR A SKINNY MAN
1
8
15
22
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30
31
7
4
21
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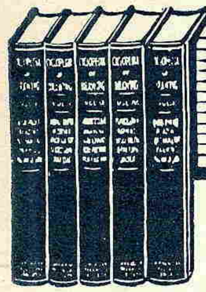

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ADDRESS ------------------------------AGE -----

Problems

[*Continued from page* 16]

together with a heavy piece of copper wire and the remaining stationary brush removed entirely. Adjusting the movable brush correctly will result in an electric motor having a speed of approximately 1,800 r.p.m.

By connecting a drill chuck to the shaft of the generator it can be used as an electric drill, but the arrangement is by no means practical for heavy duty work. Eddy currents cause the motor housing to heat up excessively and at the same time result in a reduction in the motor's speed. Good electric drills are within the reach of every pocketbook and the purchase of one practical piece of shop equipment is worth a dozen home-built makeshift devices.

APPLYING OIL PAINT OVER COLD WATER FINISH

My kitchen is painted with cold water paint. The walls are of wall board construction. I have tried to remove the finish from a small area of the wall, but have found the water has little effect on the old paint. Would it be practical to use an oil base paint over the present finish and obtain satisfactory results? I do not want the cold water paint to run through the new finish after it has been applied.—Harry Drayer, Chicago, Ill.

Since aniline dyes are used to tint most of the cold water paints on the market, much of the color penetrates the surface and will not rub off even when water is applied. If you plan on redecorating your kitchen, either an oil base or water paint can be applied over the old finish. First, sand the surface of the walls smooth and brush off all of the dust that has accumulated. The wall is then ready for a coat of flat or sizing paint or a priming coat of water paint. For a lasting finish oil paint is strongly recommended.

CONNECTING EARPHONES TO RADIO SET

I would like to install earphones on my six-tube radio receiver, but don't know just how it can be accomplished. Could you tell me some simple way to install connections for a pair of radio headphones?—King Geiss, Clarksburg, W. Va.

Earphones can be connected to practically any radio receiver in a few minutes. The only item required, in addition to a set of earphones, is a small fixed condenser. The capacity is not important, although one of approximately .001 mfd. capacity is suggested. Connect one tip of the earphone cord to the metal chassis of the set, then remove the last power or output tube and connect a copper wire to the plate prong and insert the tube back in the set. The fixed condenser is inserted between the remaining earphone cord tip and the lead extending from the tube to complete the installation.

WHITE WALLING THE SIDEWALLS OF AUTO TIRES

How are the white walls appied to auto tires? Is there any way that black tires can be given a white finish that will be permanent?—Clayton Cowan, Rahway, N. J.

The white finish on automobile tires is applied during the construction of the tire and moulded over the cord in the same manner as the tread itself. This vulcanizing operation cannot be applied to old tires. Black tires can be synthetically treated by applying one or two coats of white rubber base paint to provide an attractive white wall effect.

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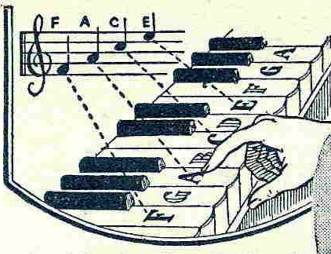

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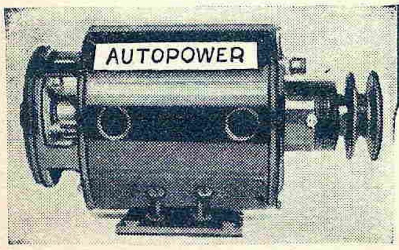

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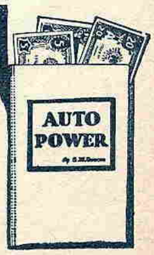

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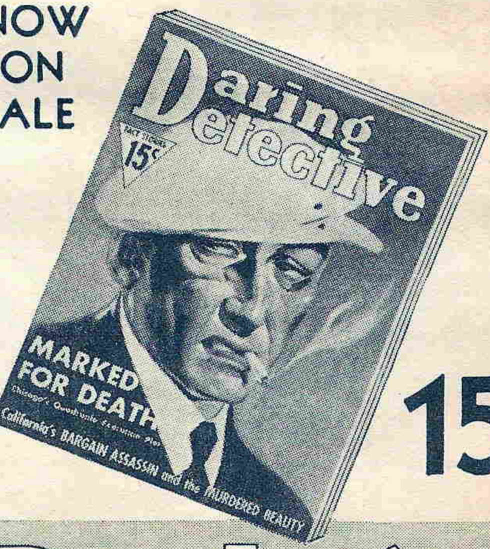

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Daring Detective

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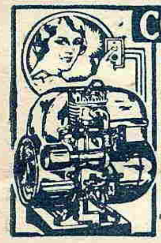

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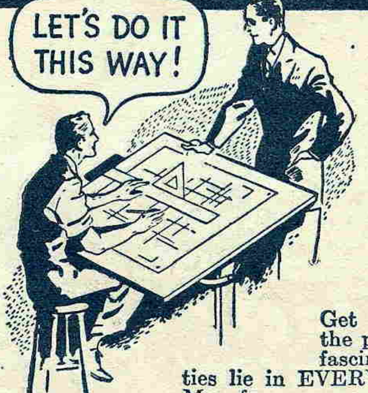
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Random Chips from

We can almost hear Walter B. Crawford of Massillon, Ohio, telling his friend to sit down as they prepare for a sail in his "Little Bear" boat constructed from MM blueprints.

THE lakes and rivers of the United States will be sailed by many new boats this season judging from recent letters and photos. Boats that were built in home workshops during the winter months are now undergoing sailing tests with anxious and proud skipper-builders at their helms. On shores and docks envious friends watch the craft being put through their paces and many are the mental vows to construct similar boats next winter.

The season is still young, however, and if YOU would like to have a boat of your own, start building it today. MM plans plus some "elbow grease" will enable you to enjoy the pleasure of sailing in short time. You can always find a friend who will be glad to lend a hand in exchange for some future rides in the boat.

***

The $5 first prize in this month's Workbench Contest was awarded to Walter B. Crawford, of Massillon, Ohio. He says:

> Dear Editor:
>
> I am sending you a photo of a boat built from "Little Bear" MM plans. I had no trouble in following the simple plans.
>
> The boat sails better than many of the larger types around here, but I would like to build a bigger craft next winter.
>
> Walter B. Crawford

Crawford is a typical MM home workshop fan —always looking for a still bigger project to tackle. Well, he certainly turned out a nice sailboat in "Little Bear" and we're wishing him luck.

***

Good outdoor weather is also causing the model airplane fans to stir and a letter and photo from John Vlahakes of Birmingham, Alabama, was awarded a prize of $3. The letter reads:

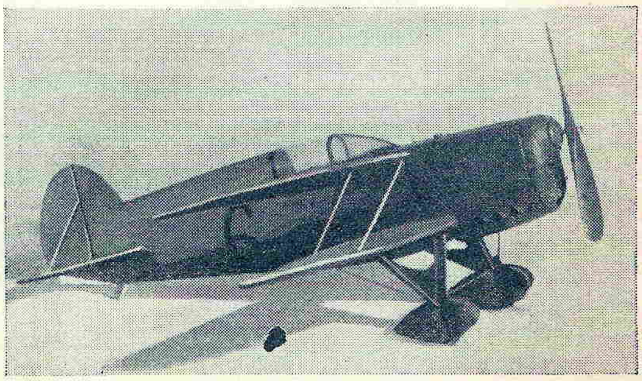
> Dear Editor:
>
> Enclosed you will find a photo of the Miles Atwood Special that I built from the plans that appeared in MM a short time ago. The model flies so fast that I cannot obtain an action photo of it, not having a high speed camera.
>
> I have had many offers for the model since I built it. I hope you will run more model plane articles soon.
>
> John Vlahakes

The Miles Atwood Special is a mighty speedy looking airplane, John. We hope you tackle the "Cloud Hooker" model which was presented in our April issue. Watch future issues for other model articles.

***

Another letter and photo of a boat project that won a prize of $3 was received from Murray A. Wick, of Portland, Oregon, who writes:

> Dear Editor:
>
> On opening this letter your eyes will fall on a snap-



Ready to "fly through the air with the greatest of ease" is this Miles Atwood Special monoplane built by John Vlahake of Birmingham, Ala. MM plans inspired John to build it.

the Editor's Workbench

shot of "Seaweed", designed and built by myself. She has proved to be very seaworthy and fast.

Carrying approximately 140 square feet of sail, the craft is 14 feet long and has a beam of five feet, four inches. The cockpit is large enough to bunk a six-footer. Practically all fittings are of sheet brass and all wood used is fir. Cost was only $75, believe it or not.

Murray A. Wick

Turning out such a splendid boat at so little expense is a double accomplishment and Murray has our congratulations. Happy sailing, Murray.

***

At a cost of only $75, Murray A. Wick of Portland, Oregon, constructed "Seaweed". It is the first boat he ever constructed.

Turning to midget autos we have a photo and letter from Earl P. Christensen of Dannebrog, Nebraska, who was also sent a $3 prize. He says:

Dear Editor:

I hope you like the photo of the midget auto which is enclosed. It is built entirely of scrap parts secured from junk yards.

Powered by an old motorcycle engine, the tiny car travels 35 m.p.h. The wheelbase is 69 inches, and there is room for two persons in the seat.

I enjoy MM very much and want to thank you for the many helpful ideas it presents in every issue.

Earl P. Christensen

We could not give all the details of the construction of the midget as sent by Christensen, but we do say that he has been very clever to turn out such an excellent car from junked parts.

***

A home-built tractor project won a $3 award for Elmer Johnson, of Niobe, N. Y., whose letter states:

Dear Editor:

Powered by an old Dodge engine, the tractor (photo enclosed) I have built has six forward speeds and two reverse. The front wheels are set close together and enable the tractor to be turned in a seven-foot radius.

Elmer Jonson

Good work, Jonson. The tractor looks as though it is capable of easing arduous farm work.

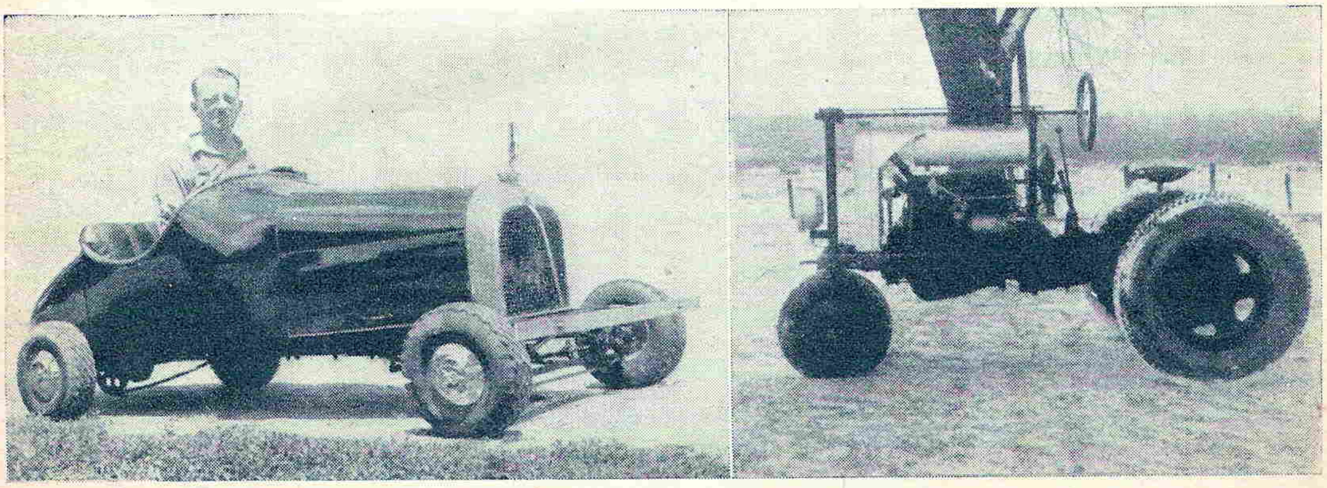
***

Trailer fans will like the letter received from W. C. Bradley, of Vergennes, Ill. Here it is:

Dear Editor:

Being interested in trailers, but unable to use one

[*Continued on page* 24]



Earl Christensen of Dannebrog, Nebraska, has every reason to be proud of the trim midget racer he constructed (left). It is made of junked auto parts and powered by an old motorcycle engine. Elmer Jonson of Niobe, N. Y., has had quite some experience at building tractors, but he claims the one shown above is the best he ever produced. It has eight speeds.

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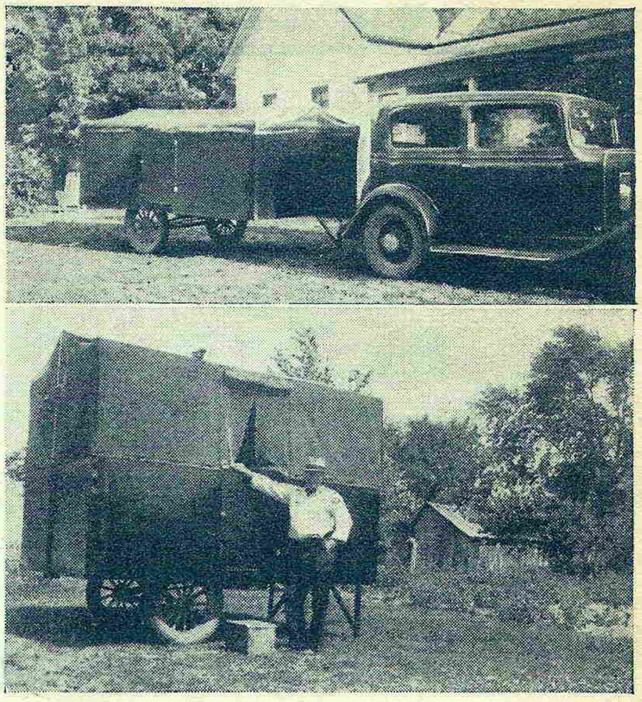
Editor's Workbench Chips

[*Continued from page 23*]



Unable to use a trailer for more than a few weeks each year, W. C. Bradley, of Vergennes, Ill., built this low-cost type. Upper photo shows how the top can be lowered for traveling.

except for about two weeks each year, I built a small low-cost type. I am sending two photos as they may interest your readers.

I used the trailer to make a 3500-mile trip and my family of four slept comfortably in it every night. The top of the trailer is collapsible.

W. C. Bradley

Bradley's low-cost "house-on-wheels" should interest every MM trailer fan.

***

George M. Stinnett, of Charlottesville, Va., sent a letter that made the editor feel good. He writes:

> Dear Editor:
>
> I want to congratulate you on your fine magazine. It is the best medium I know of to keep the average man abreast of current mechanical inventions and scientific achievements.
>
> George M. Stinnett.

Thanks, Mr. Stinnett, that is just the type of magazine we want MM to be and we are glad to know that you, like so many of our readers, feel that we are doing a good job.

***

In future issues of MM, readers will find increased space devoted to photographic, radio and workshop subjects. If your favorite hobby does not fall in any of these classifications, please send us a postcard suggesting the types of articles that you prefer.

[*Continued on page 26*]

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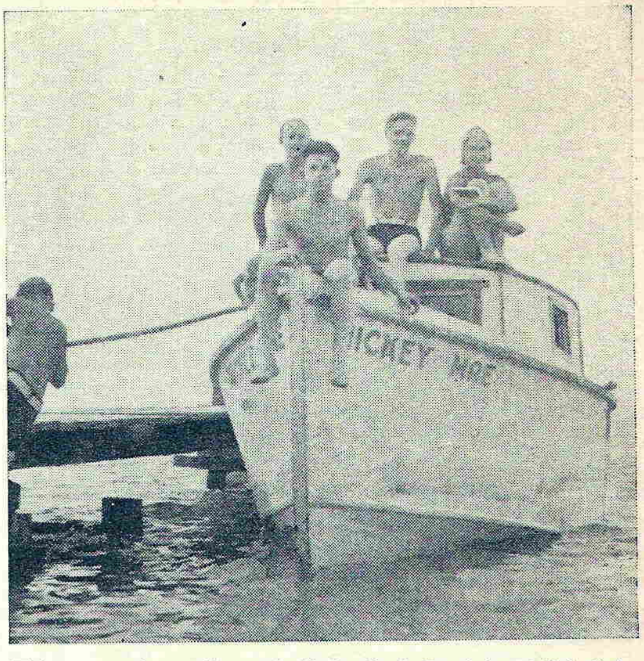
SEND NO MONEY Pay postman only $2.99 plus postage on arrival or send $2.99 (M. O., check, cash) and yours will be sent postpaid. GUARANTEED. Can be used by anyone. A most unusual value. ORDER NOW! DEALERS.

TINYTONE RADIO CO., Dept. M-6, Kearney, Nebraska

Editor's Workbench Chips

[*Continued from page 24*]



This seaworthy craft was built by J. S. Bardole of Salt Lake City, Utah, from plans in the MM manual, "How To Build Twenty Boats." It rides well on waves ten feet high.

An interesting boat project letter and photo was received from J. S. Bardole, of Salt Lake City, Utah, who was awarded a prize of $3. He writes:

> Dear Editor:
>
> Enclosed is a photo of the boat I built from plans in your "How To Build 20 Boats" book. The plans were followed except for a few changes such as placing three windows in the cabin instead of two and using a gas tank of 50-gallon capacity instead of 20 gallons.
>
> Great Salt Lake is 90 miles long and 50 miles wide and storms can come up in about ten minutes. However, "Mickey Mae" has been out when the waves were ten feet high, riding them in great style.
>
> J. S. Bardole.

The *Mickey Mae* looks like a seaworthy craft and, judging from the photo, is very popular with local bathers.

***

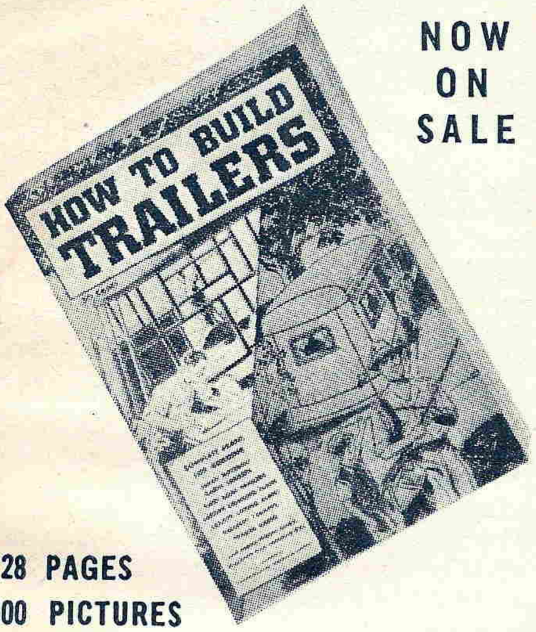
In response to the numerous letters requesting information as to the possibility of starting gliding clubs, we refer all interested readers to the offices of the Soaring Society of America located at 1500 Locust St., in Philadelphia, Pa.

The SSA is the parent organization that guides gliding and soaring activities in the U. S., organizing local clubs, holding competitions, locating new soaring sites, publishing a bulletin devoted to soaring, and helping to arrange for the licensing of gliders and glider pilots.

The Soaring Society of America has been steadily increasing the number of soaring sites throughout the U. S. during the past year. A site was developed at Ellenville, N. Y., and has proved to be well suited for regularly scheduled soaring activities.

HOW TO BUILD TRAILERS

THE BOOK THOUSANDS HAVE BEEN WAITING FOR



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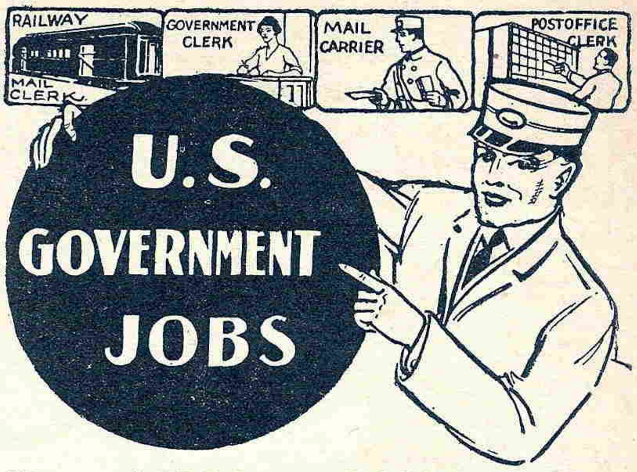

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Railway Postal Clerks on long runs usually work 3 days and have 3 days off duty or in the same proportion. During this off duty their pay continues just as though they were working. They travel on a pass when on business. When they grow old, they are retired with a pension.

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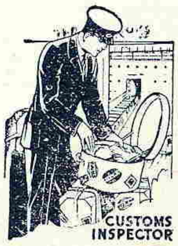
Clerks and Carriers now get $1,700 the first year on regular and automatically increase $100 a year to $2,100 and $2,300.



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New Control Aids Airships

The danger of airships twisting and breaking in mid-air when struck by gusts or squalls—disasters such as that which ended the Navy's Shenandoah, Akron and Macon—may be eliminated by the invention of a new type of airship control described in a patent (No. 2,058,803) granted here to W. B. Klemperer and Herman R. Liebert, of Silver Lake and Akron, Ohio, respectively. The patent is assigned to the Goodyear Zeppelin Corp., foremost airship builders in America.

The new control comprises two novel, retractable elevators, movable fins which are placed near the nose or bow of the ship. This is the salient feature of the invention.

In addition to the usual tail fins and tail elevators with which airships are outfitted for steering, the bow elevators rotate freely so that under normal flight, they trail or float in the wind. But when a sudden gust or squall comes up, an electrically controlled mechanism automatically turns them to the proper "angle of attack" in proportion to the bending force exerted by the wind. This enables them to neutralize the bending impact.

If the gust tends to zoom the airship upward, the elevators assume a position where an opposite neutralizing force is exerted on the ship.

It is the bow of the airship which gusts of wind strike first and any attempt to control them with the tail fins and elevators alone causes tremendous bending and twisting forces, say the inventors.

However, in an airship outfitted with the new bow elevators, these bending forces are intercepted right at the seat of attack and counteracted. The ship is saved severe buffeting and its path is smoothed out; danger of being blown off course is minimized.

The bow elevators also permit the airship to "hop" over obstacles. By maneuvering them, the pilot can "lift" the bow of his ship over first, and then by manipulating the tail elevators lift the tail over.

"Gasomat" Is Forecast

A remote control fuel pump patent which would make the gasoline service station of the future approach the present-day "automat" has been granted J. E. Head of El Dorado, Ark.

All the machinery for supplying gasoline is controlled from a central cashier's booth. Here is how it operates:

You drive up to vacant pump and stick the hose nozzle in the tank of your car. Then you walk over to the cashier and pay him for the amount of gasoline you wish. While you are walking back he sets your pump for the paid amount of gasoline and the pump automatically measures it out. You merely open the valve in the hose nozzle and let the gasoline drain into your tank.

Flash!

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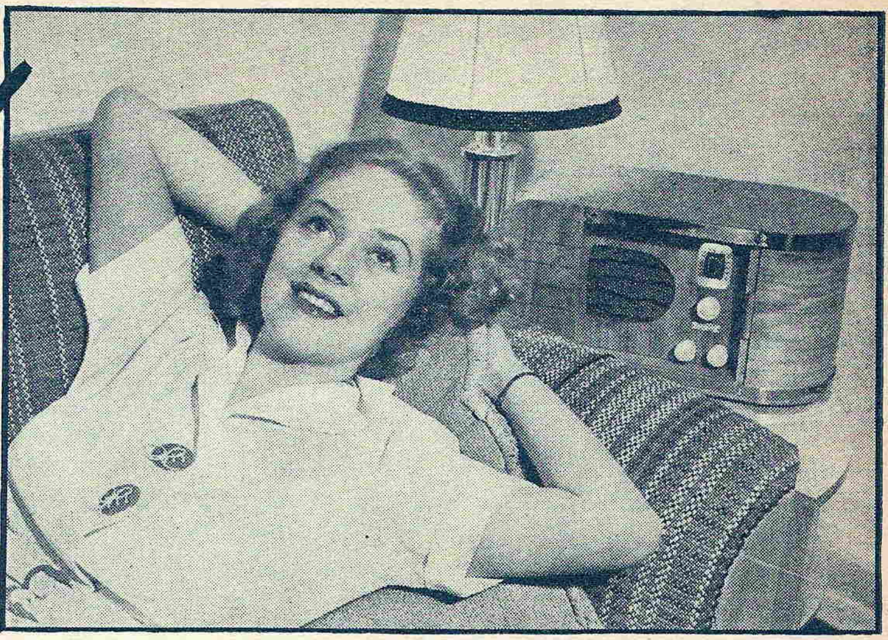
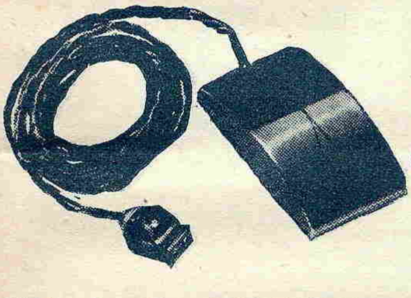
NEW WORLD
OF RADIO
AWAITS YOU!



Alice Faye in a scene from "Wake Up and Live," the 20th Century-Fox picture in which she is co-starred with the famous feuding pair, Walter Winchell and Ben Bernie.

DICTOGRAPH *Silent!* RADIO

With Acousticon Mystic Ear



***This is the* ACOUSTICON**

MYSTIC EAR!

Not an earphone, nor miniature speaker, the Acousticon Mystic Ear brings 60% of sound through bone conduction. Simply place the Ear behind a pillow on chair, couch or bed. Rest your head back against the pillow. You hear alone. Inaudible to others only a few feet away. Deaf can hear with amazing realism.

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and 1,630,028

Model shown in white, natural finish oak with waterproof cork top. 6-Tube Superheterodyne. AC-DC. $75.00. Other models from $49.50 up

DICTOGRAPH PRODUCTS CO., INC.
580 Fifth Ave., New York, N. Y.

★ As important to the radio world as was the first loud speaker! The Dictograph Silent Radio brings *personalized* reception through the Acousticon Mystic Ear. You can listen in *alone,* without annoying others who want to sleep, talk or read. Only the Dictograph Silent Radio offers you the Acousticon Mystic Ear in addition to loud speaker reception. Either may be used at the turn of a switch.

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STAMP COLLECTING

TO ORDINARY laymen, stamp collecting may seem like a waste of time, effort and money. But to those who have been "bitten by the bug" it is the most interesting hobby any man, woman or child can take up.

When such well-known persons as the late King George V of England, the late Arthur Hind of Utica, New York, President Franklin D. Roosevelt, Queen Helena of Italy, Suzanne Lenglen, famous French tennis player, Adolphe Menjou and Clara Bow, of the silver screen, and countless other personages of world-wide fame were and are collectors, it is no wonder that this hobby is so popular with millions of Americans.

A collection numbering from 20,000 to 50,000 varieties can easily be assembled and arranged in three or four albums which can be transported, displayed or stored in a comparatively small space. Compare this with the space necessary to assemble 500 to 1,000 specimens of arrow-head coins, Chinese jade idols or fire-arms. So it is easy to see why millions collect stamps and only thousands collect other material objects.

With such a tremendous following, it is no wonder that many persons collect stamps for profit. Stamp collections are more "liquid" than arrow-heads, fire-arms, etc., and there is always a market for carefully selected copies. Mint stamps of the United States, Great Britain, the British Colonies and many other countries are always worth face value. They also show the best possibilities for increase in value. In most large cities in the United States there are reputable firms that will lend money on collections. A collection may also be insured against loss, fire or pilferage.

Stamp collecting affords many hours of entertainment and an intimate knowledge of history, foreign customs, etc., not acquired except through extensive travel. To get the most out of this branch of philately, a person should spend considerable time searching for information surrounding the subject pictured on the stamp. In this way he or she will have a detailed knowledge of each country, its rulers and its history.

The second phase of collecting deals with

PHILATELIC EXCHANGE OF NEW YORK
QUOTATIONS

Philatelic exchanges in New York and Philadelphia, operated along the lines of Wall Street brokerage houses, lend a touch of "big business."

Sheets of new issues are bought by dealers and stored for future sale. Below—Stamp expert checking perforations.

FOR PROFIT

by Frank G. Stein

the building of a collection for monetary profit. This branch also demands intensive study, but with an entirely different objective in mind.

Here a person may progress just as fast as his finances permit. A definite budget should be set up and followed religiously. To accomplish this purpose, a certain sum of money should be set aside each week or each month to purchase stamps. In this way cash will be on hand when the stamps wanted become available or additional copies can be secured.

Be patient. Scrutinize carefully before you buy. To make your collection of real cash value, each stamp should be of very fine or superb quality. Look for perfect centering, clearness of color, complete perforation (except in the case of imperforates or part-perforates), and light cancellation when a used copy is desired. Be sure to check perforations, watermarks and secret markings. These identification marks are important, as they determine the exact cataloging of specimen.

If there is any doubt as to the authenticity of the copy, do not buy it until you have definite proof. There are many specialists among the dealers in the business who are competent to verify issues. Always purchase stamps from a dealer whom you know to be trustworthy. If possible, select one through whom you will do most of your buying. It will familiarize him with your requirements, thereby enabling him to offer you better merchandise at more favorable prices.

To start a profitable collection it is advisable to pick a country or countries in which you are going to specialize. Then get singles of as many varieties as possible (preferably mint unless used copies catalog at a higher price), and start with issues which can be secured easily. If you are going to specialize in United States issues, get acquainted with your local postmaster. If the postal clerk is informed that stamps are being purchased for collection purposes he will usually search for well-centered copies for you.

After a fairly representative collection has been assembled, the next step is to start buying varieties, blocks of four, or even whole sheets, if funds permit.

When a single and a block of four are in your possession they should be mounted in neat style in a loose-leaf album. By doing this it will not be necessary constantly to change stamps from one album to another, thereby chancing damage. Sheets are easily rearranged.

After a good start has been made on more recent issues, a collector can work back on catalog numbers to acquire some of the older stamps and to complete sets with some of the higher priced items. A collection is usually valued by its number of completed sets of fine or superb stamps.

It is amazing how quickly a collection builds into sizeable proportions and monetary value, and it is gratifying to watch the values of various issues climb from year to year.

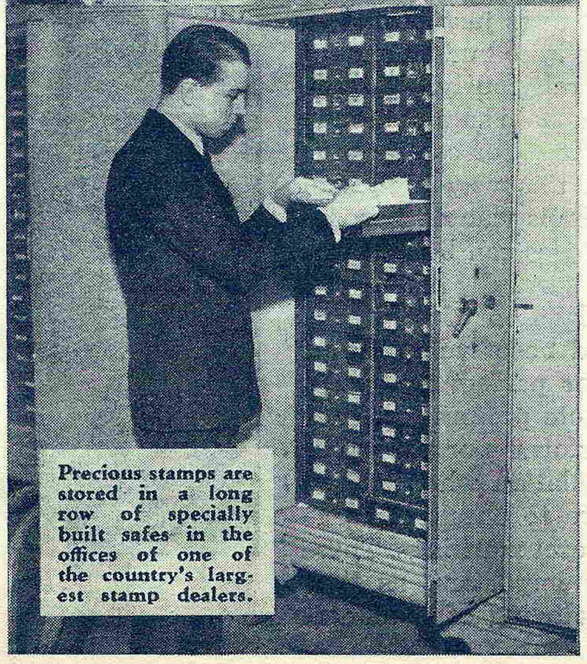
Dwelling for a few moments on U. S. issues, a study should be made of individual issues in order to determine which ones deserve the most attention. Commemorative stamps are always in demand and show the greatest possibilities for improved value.

Many commemoratives issued during the last decade have jumped in catalog value from two to ten times their face values. An outstanding example of increased value is the series of three Zeppelin stamps issued during 1930. These had a face value of

[Continued on page 134]

Editing a stamp album is a job that calls for an expert. Mrs. Theresa M. Clark is one of the few women qualified for this work. She is shown preparing a new album.

Envelopes with used stamps are obtained by stamp wholesalers from large business houses. Here the stamps are sorted and prepared for future handling.



Precious stamps are stored in a long row of specially built safes in the offices of one of the country's largest stamp dealers.

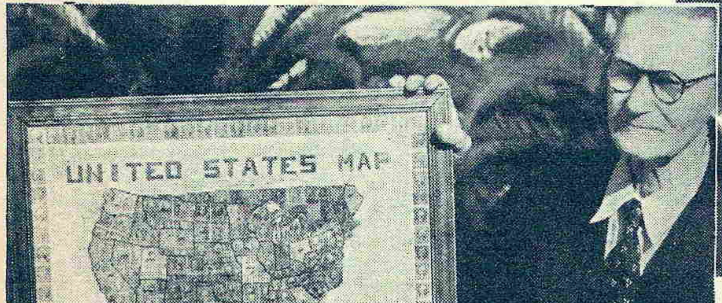
WITH THE HOBBYISTS

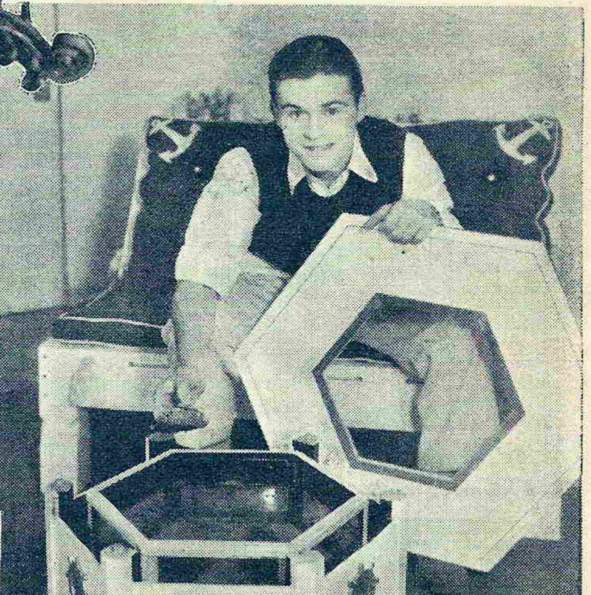
Wood carving, painting, carpentry and stamp collecting are hobbies for these people.

Dorothy Ramsey of Laguna Beach, California, pursues the odd hobby of making Mexican wood carvings and finishing them in brilliant colors. Using only a pen knife, gouge chisel and sandpaper Miss Ramsey completes a carving in two hours. She is pictured above with a few of her unusual carved wood plaques.

Consisting of more than 750 inlay pieces this unique violin is handycraft of Sam Hatton of Vincennes, Ind. Each piece of wood was carved and glued to fit by Mr. Hatton, shown above playing instrument. Experts claim its tone is unusually fine.

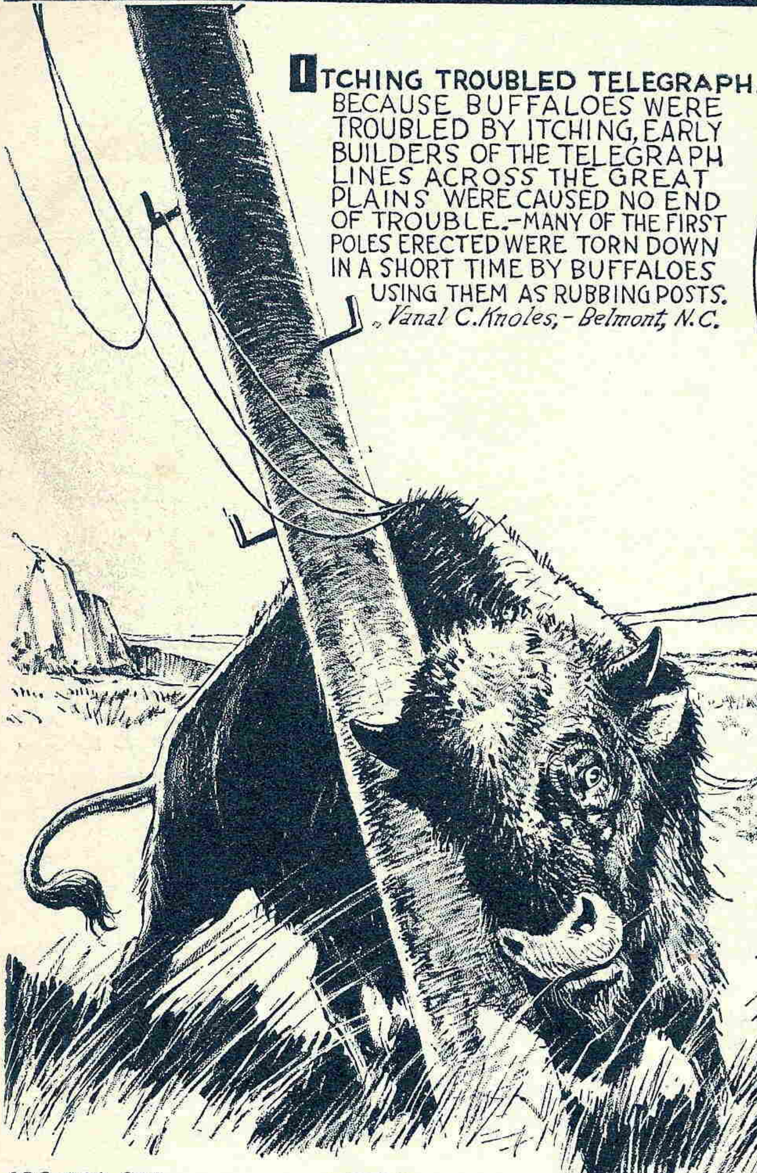
Designing maps and portraits of prominent persons with used postage stamps is the interesting occupation of Leo Gunster, below. A collector for more than sixty years, Mr. Gunster has used more than 50,000 stamps in making his novel pictures which include portraits of F. D. Roosevelt, Will Rogers, etc.



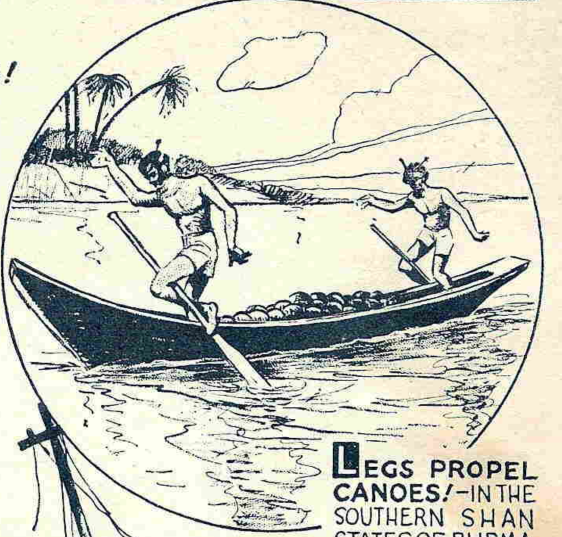


This illuminated aquarium designed by Tom Brown, youthful movie star, is also a serviceable coffee table. Intended for use in his nautical bedroom the table is decorated in true sea style with small port holes fashioned after miniature ship's wheels. A plate glass insert in the table permits the fish to be watched.

Telegraph Poles Served as Scratching Posts
Nic Sprank Offers $5.00 For Best Oddity

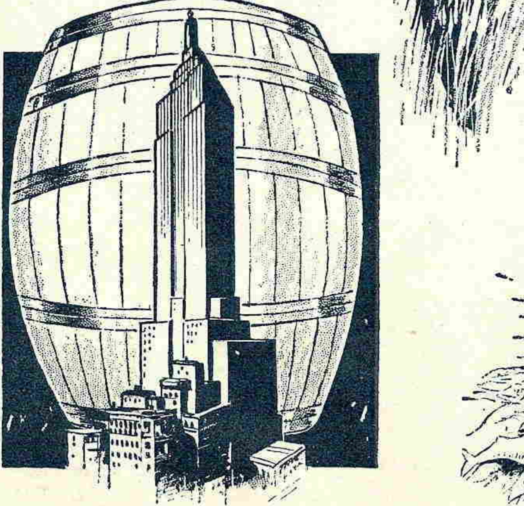


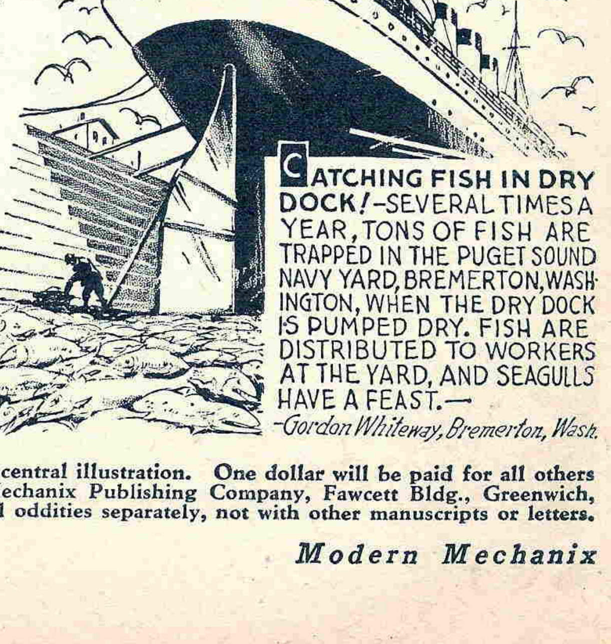
ITCHING TROUBLED TELEGRAPH! BECAUSE BUFFALOES WERE TROUBLED BY ITCHING, EARLY BUILDERS OF THE TELEGRAPH LINES ACROSS THE GREAT PLAINS WERE CAUSED NO END OF TROUBLE.—MANY OF THE FIRST POLES ERECTED WERE TORN DOWN IN A SHORT TIME BY BUFFALOES USING THEM AS RUBBING POSTS.
Vanal C. Knoles, - Belmont, N.C.



LEGS PROPEL CANOES!—IN THE SOUTHERN SHAN STATES OF BURMA, INTHA TRIBESMEN PROPEL THEIR CANOES BY PADDLES MANIPULATED BY THEIR LEGS INSTEAD OF HANDS. STANDING FIRMLY ON ONE LEG, AND THE OTHER AROUND THE PADDLE THESE CANOEISTS ARE SAID TO BE CAPABLE OF REMARKABLE SPEED FOR LONG PERIODS OF TIME.—
John F Dopak, Jr.
Chicago, Ill.

138,000,000 GALLONS A MINUTE! WATER FLOWING OUT OF THE MISSISSIPPI WOULD FILL A BARREL HIGHER THAN THE EMPIRE STATE BUILDING EACH MINUTE. EVERY 60 SECONDS 138,000,000 GALLONS LEAVE THE RIVER'S MOUTH.—
Warren Phillips,
Merrick, Long Island.





CATCHING FISH IN DRY DOCK!—SEVERAL TIMES A YEAR, TONS OF FISH ARE TRAPPED IN THE PUGET SOUND NAVY YARD, BREMERTON, WASHINGTON, WHEN THE DRY DOCK IS PUMPED DRY. FISH ARE DISTRIBUTED TO WORKERS AT THE YARD, AND SEAGULLS HAVE A FEAST.—
-Gordon Whiteway, Bremerton, Wash.

Five dollars will be paid for the oddity used by Nic Sprank as his central illustration. One dollar will be paid for all others used on this page. Send your oddity to Nic Sprank, Modern Mechanix Publishing Company, Fawcett Bldg., Greenwich, Conn. Source or proof of each oddity must be given. Send all oddities separately, not with other manuscripts or letters.

BUSINESS MACHINES—A CAREER

A Guest Editorial

FRANK E. TUPPER

IT IS no exaggeration to say that there is not an industry anywhere that devotes greater effort, is more concerned with furthering the fundamental purpose of invention and efficiency, than does the far-reaching, thorough-working business machines and equipment industry. Without the business equipment of today—products of skilled craftsmen, intense study and inventive genius—modern business would be impossible. Growing demands for new methods to execute new policies and administrative functions are met with amazing dexterity. A recent example is the transformation of Social Security from legislative theory into operational fact.

From mechanical pencil to electric tabulator, from paper clip to automatic billing, calculating and listing machines, the products and progress of this little-sung industry have a romance and history that to me are as great as those of any other group of modern manufacturers. Through the National Business Show, the annual educational medium by which the public is kept abreast of the industry's products and developments, a bit of this inspirational force is transmitted to those who see beyond the typewriter keyboard, beyond the cold and silent desk-top.

An all-embracing perspective of the objectives, the energy, the ethics and the principles of the industry, its strength, its growth and the brilliance of its future, satisfies me that, as a career, no line of endeavor promises the serious thinking young man or young woman greater rewards in security, achievement and self-satisfaction.

Frank E. Tupper

President
National Business Show

ONE CHANCE

Fuselage compartments loaded with bombs and an extra one slung beneath a wing, a huge Martin Bomber warms up its engines in preparation for taking off for a day raid on the army's desert range at Muroc Lake, Calif.

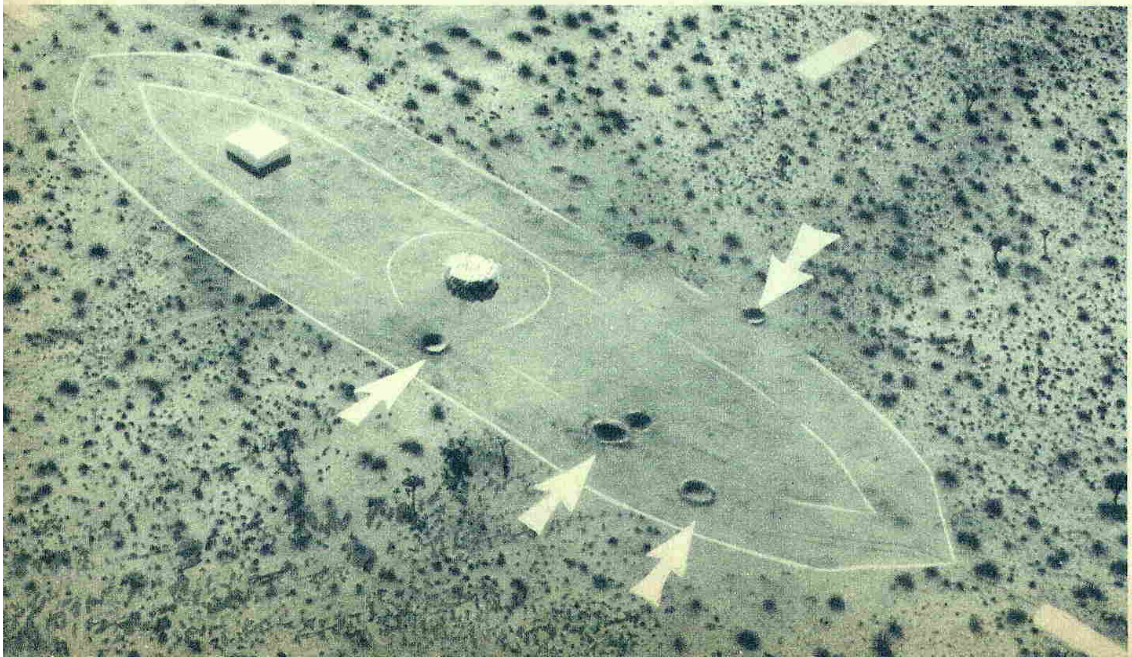
Flying in darkness over the desert, a U. S. Army bombing plane felt the tug of the Grim Reaper at its wingtips.

by Brigadier-General H. H. Arnold, D.F.C.,

Asst. Chief of the Air Corps

BOMBING by day has its hazards and dangers but what additional chances does the crew of the bombing plane take when bombing at night? Forced landings, dangers of collisions in the air, mishaps during landings and take-offs are always possible and more serious at night than during the day and especially so when the plane is loaded to the limit with high explosive bombs. However, the Army bombing squadrons must be prepared to locate and hit targets at night as well as by day. If they cannot, they are not sufficiently well trained to take their place in our national defense machine. The other arms and service branches are expected to carry out their missions regardless of daylight or darkness and so must our Air Corps.

Day bombing missions permit the bombers to see the targets quite distinctly and so use their bomb sights without difficulty, but at night targets cannot be seen or picked up unless they are illuminated. It has been found



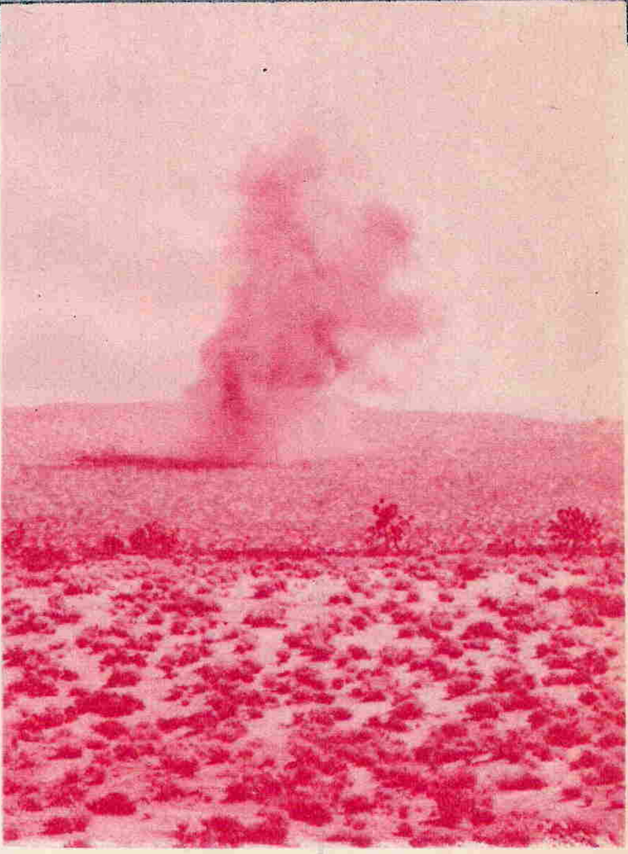
The arrows indicate craters made by several direct hits scored from an altitude of 1,000 feet. Located in the Mojave Desert, the range is constantly used for day and night operations by bombing squadrons located throughout California.

in a MILLION

Powerful engines roaring, a group of Martin Bombers makes a pretty picture as each is outlined against the sky on their way to the desert range. Highly trained pilots, observers, and crews are required in order to carry out a successful raid.

that during night tests, when large cities have been completely darkened, aviators have flown directly over the city without being aware of its location. This can only occur when the night is pitch black and there is no moon. If the area of a large city cannot be located by bombers, how then can they locate and direct their sights on smaller targets such as bridges, railroad centers, ammunition dumps, water supplies or power plants?

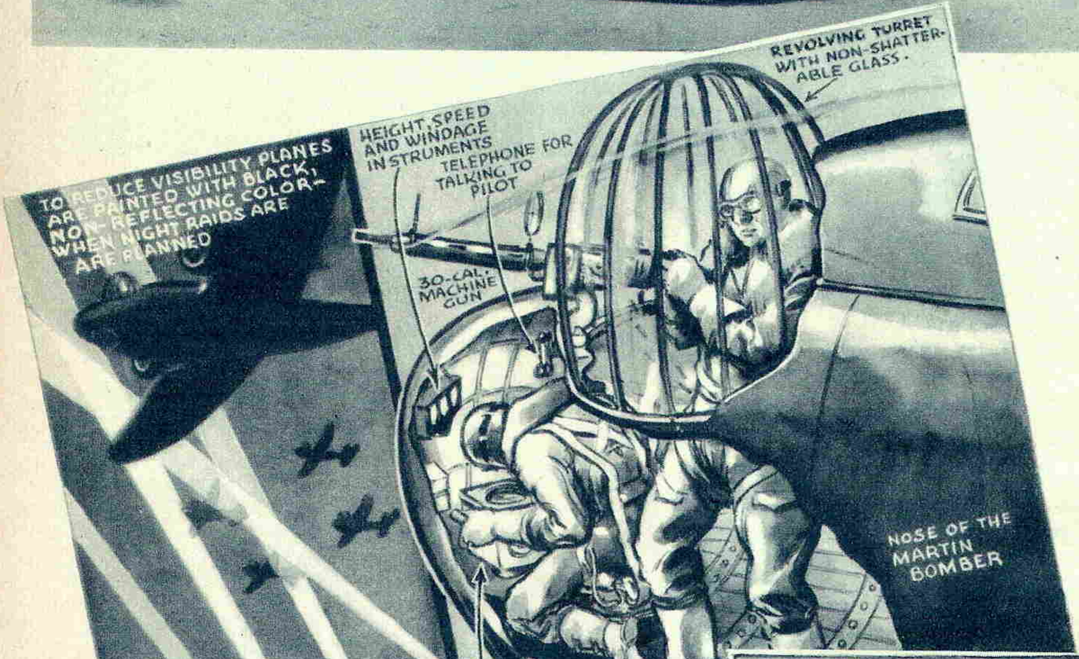
During the World War bombing planes flew to a general area in which the crew supposed the target to be located and took a chance that some of their bombs might hit the target assigned to them. In some instances the target was illuminated and they were able to use their sights for precision bombing, but in many cases the bombs were dumped with the hope that some of them at least might reach the target. Bombing today is carried out far differently. Modern sights provide a means of making hits instead of misses regardless of the speed of the planes or the direction of the wind. Observers at bombing practice, after watching planes flying overhead at extreme altitudes, are inclined to believe that altitude has very little effect upon accuracy. Such a belief is well founded for time and time again bombing planes so high in the air that they appear only as small specks in the sky have dropped their bombs so accurately that they have completely covered the target.



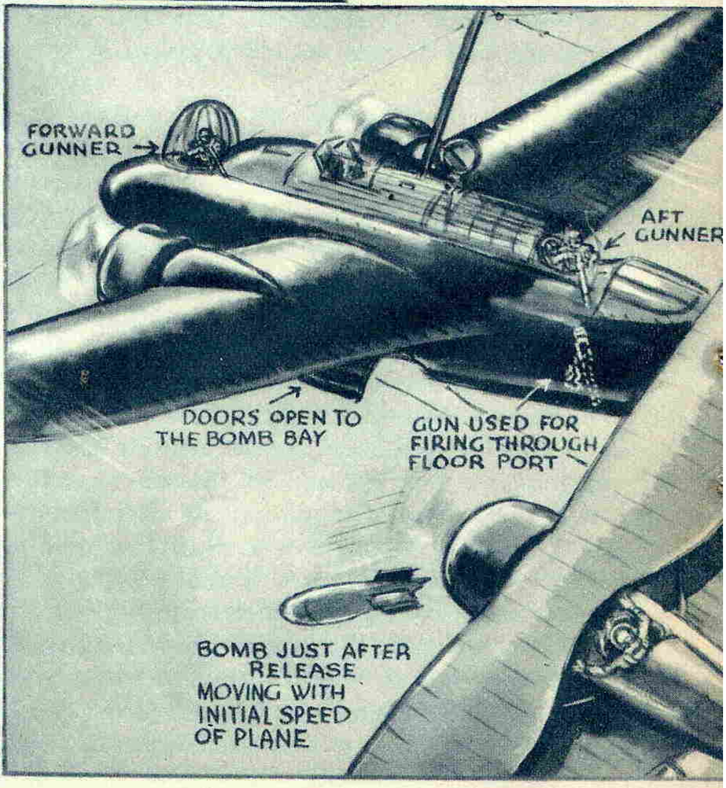
A 300-pound high explosive demolition bomb raises a dirt cloud as it explodes at Muroc Lake. Appearing as specks in the sky, the bombers drop their missiles with great accuracy.

In warfare, day bombing subjects the attacking planes to the fire of anti-aircraft artillery and interference by hostile pursuit planes. Both of these weapons may not only be disconcerting, but they may also present such an obstacle as to prevent the bombing planes from reaching their objective. At night, the pursuit planes have extreme difficulty in getting within fighting range of the

Armament crews (above) are given training in the handling of large-sized bombs through the use of 600, 1,100, and 2,000-pound dummies made of concrete, regular bombs of these sizes being too expensive for use in practice.

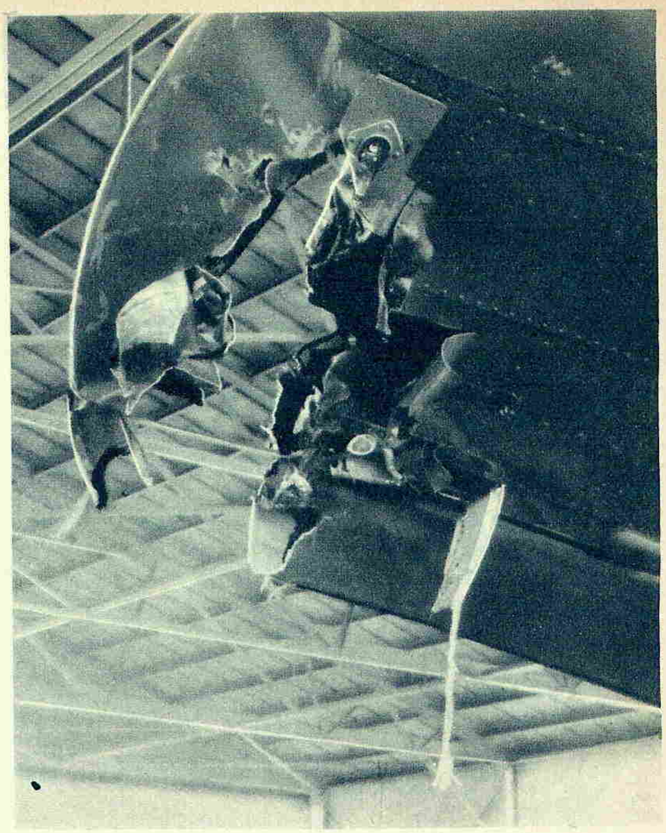

REVOLVING TURRET WITH NON-SHATTERABLE GLASS.
HEIGHT, SPEED AND WINDAGE INSTRUMENTS
TELEPHONE FOR TALKING TO PILOT
TO REDUCE VISIBILITY PLANES ARE PAINTED WITH BLACK, NON-REFLECTING COLOR—WHEN NIGHT RAIDS ARE PLANNED
30-CAL. MACHINE GUN
NOSE OF THE MARTIN BOMBER
BOMBARDIER SIGHTING ON TARGET
3-BLADED PROPELLERS AND MANIPULATION OF EXHAUSTS AID THE PLANES TO FOOL SOUND LOCATORS

The artist's drawing at the left shows the manner in which the nose of a Martin Bomber is protected against attack by enemy planes. While a bombardier adjusts sighting apparatus, a gunner within a non-shatterable turret sweeps the sky with swivel mounted machine gun.


FORWARD GUNNER
AFT GUNNER
DOORS OPEN TO THE BOMB BAY
GUN USED FOR FIRING THROUGH FLOOR PORT
BOMB JUST AFTER RELEASE MOVING WITH INITIAL SPEED OF PLANE

bombers. The anti-aircraft artillery must rely upon the searchlights and the sound detectors to locate the hostile planes. At extreme altitudes the modern high speed plane presents a very small target and is easily missed by the searchlights. The odds are greatly in favor of the attacking bombers.

Thus it is that the Army Air Corps trains its bombing crews to operate during day and night with the same facility. As there is always the danger of having hung bombs or having a green crew miss the target by a wide margin, night bombing can only be carried out where there are especially selected ranges with few if any people near the area.



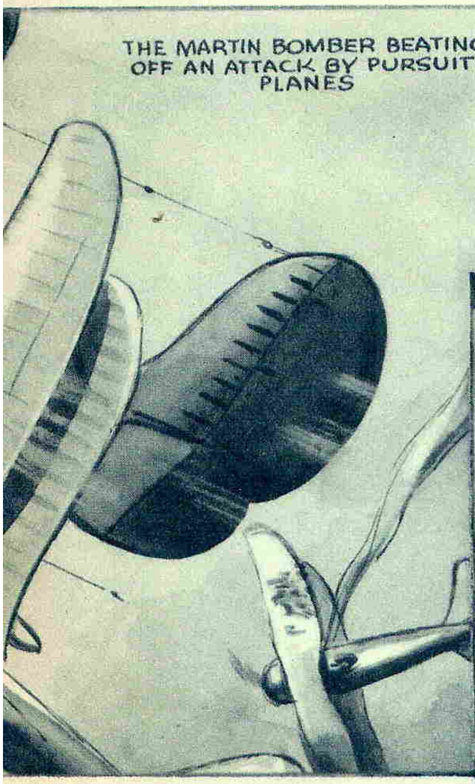
The Grim Reaper was close at hand when the right wing tip (above) of a bombing plane piloted by Lieut. Norris B. Harbold was struck by a bomb released from another plane flying overhead. Fortunately, the bomb passed through the wing without exploding.

Such a location is the bombing range in the Mojave Desert at Muroc Lake, California. The desert in that locality is quite deserted except for rattlesnakes and horned toads. Thus it makes an ideal spot for bombing practice for the squadrons stationed in the state.

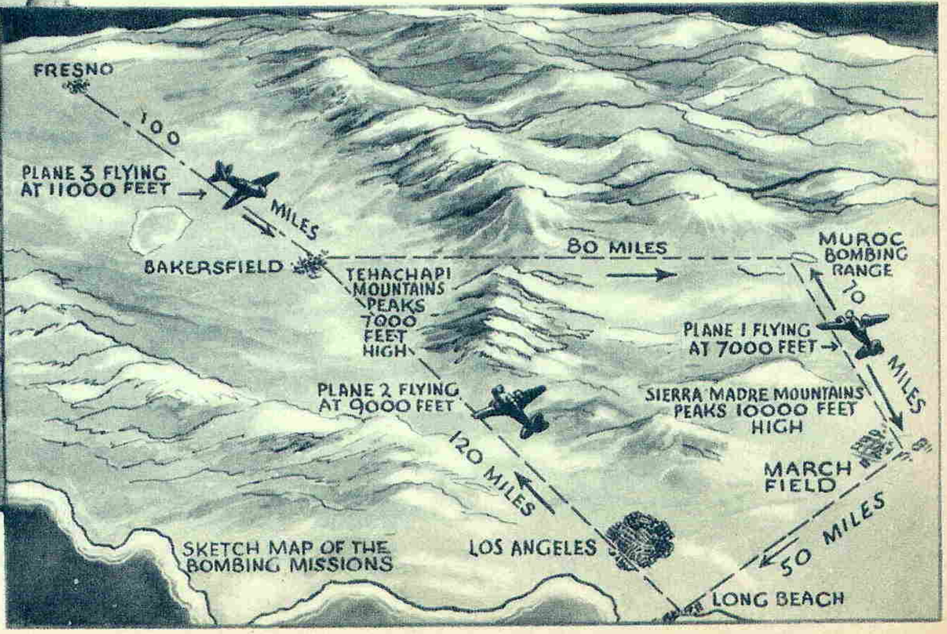
Night bombing has always been controlled by having the planes reach the target at definite time intervals. This is essential to prevent collisions in the air and that "million to one chance" of having a bomb from one plane hit another. In peace time practice 100 and 300-lb. bombs are usually dropped. Either one could do a lot of damage if it hit a plane either in the air or on the ground. In order to give the armament crews training in handling the larger size bombs, 600, 1,100 and 2,000-pound dummies have been made from concrete. Regular bombs of these sizes are quite expensive. The concrete bombs drop with about the same accuracy and are just as visible when hitting the ground as the regular ones.

Each plane is normally equipped with a bomb sight and the crews secure their experience and training by having individual practice. Generally the planes are sent to the target so as to arrive there at different times, from different directions, and at different altitudes. A route to and from the target is assigned to each plane to prevent collisions, and to give practice in bombing under varied wind conditions. Targets look entirely different when approached from opposite directions. A bomber who cannot find a target is no better than one who cannot hit a target. To perform their missions they must be able to find a target under any and all conditions and also be able to hit it. Both of these jobs require much training.

At night, the targets are illuminated by flares or by lights on the ground. The bomber


THE MARTIN BOMBER BEATING OFF AN ATTACK BY PURSUIT PLANES

Protected by machine gunners at the nose and tail (left), a Martin Bomber makes a formidable adversary for any attacking planes. Below —Sketch showing how planes are given different routes and altitudes during practice raids so they will arrive over target at different times.

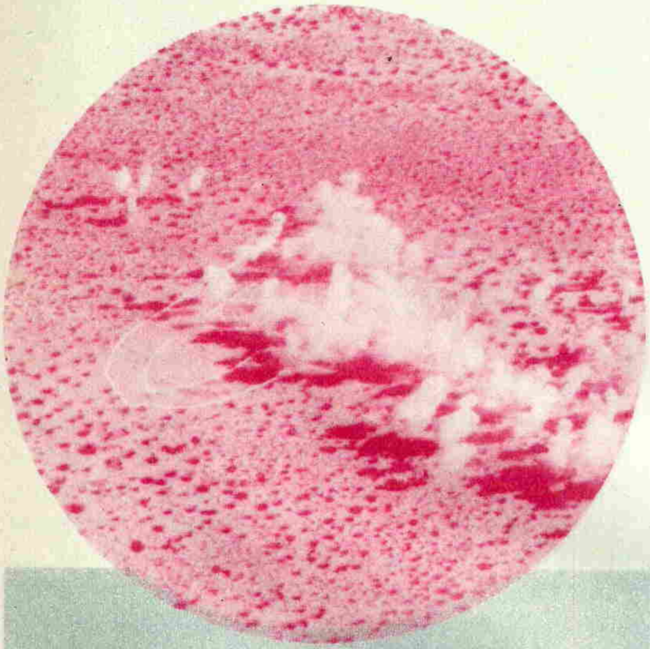

FRESNO
100 MILES
PLANE 3 FLYING AT 11000 FEET
BAKERSFIELD
80 MILES
MUROC BOMBING RANGE
TEHACHAPI MOUNTAINS PEAKS 7000 FEET HIGH
70 MILES
PLANE 1 FLYING AT 7000 FEET
PLANE 2 FLYING AT 9000 FEET
SIERRA MADRE MOUNTAINS PEAKS 10000 FEET HIGH
120 MILES
MARCH FIELD
50 MILES
LOS ANGELES
SKETCH MAP OF THE BOMBING MISSIONS
LONG BEACH

is able to pick up the lights by direct contrast with the blackness in all directions. Once the lights are in the sight, the bomber directs the pilot so as to have the plane fly a course from which the bombs will hit the target. It is surprising how accurate such bombing at night can be.

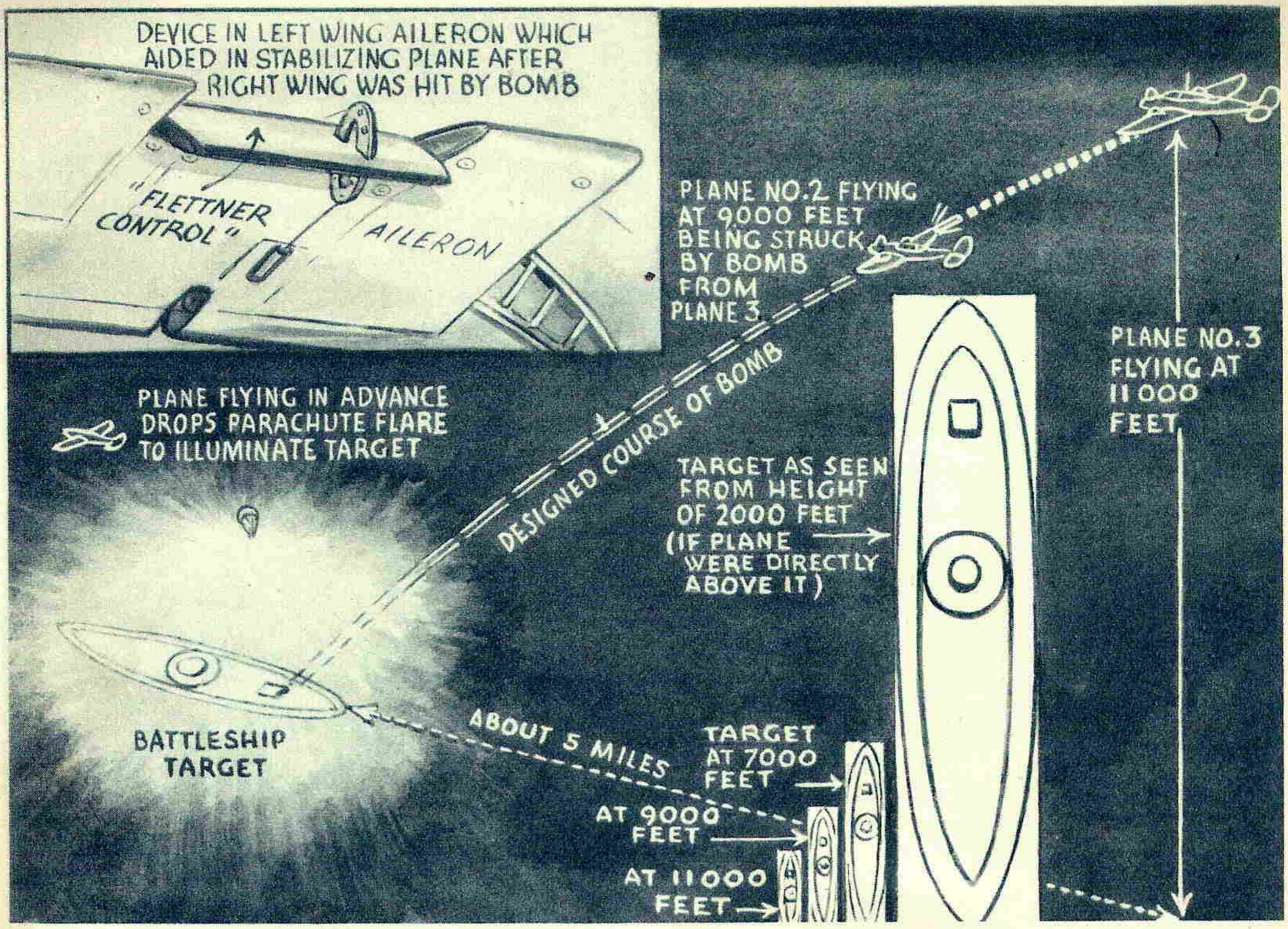
Precautionary measures to prevent mishaps are always taken. Everything possible must be done to eliminate all chances of accidents. However, no matter how experienced the bomber may be, there is always the fear that at some time his plane may be hit in mid-air by another plane or by the bomb from another plane. Time and time again the statement has been made that it is a "million to one chance" that such a thing can happen. Let us now see why it is a million to one chance.

Quite recently, during night bombing practice at March Field, Calif., it was decided to send out three Martin bombers at the same time. The first plane was given the course from March Field direct to Muroc and return. The second was to proceed from March Field to Long Beach to Bakersfield to Muroc and return. The third was to fly from March Field to Fresno to Muroc to March. The first had 70 miles to go before reaching the bombing range, the second 250 miles and the third 450 miles. The first one took off at 9:00 p. m., followed by the others in succession at two minute intervals. All three planes had the same cruising speed and should have reached the target at 150-mile-an-hour speed as follows: No. 1 at 9:27; No. 2 at 10:36; No. 3 at 12:04.

To further eliminate any chances of interference No. 1 was assigned an altitude of 7,000 feet over the target, No. 2—9,000 feet and No. 3—11,000 feet. With such a plan it is quite obvious that there is little chance for a mishap between the three planes. However, there are always a number of variables which change the picture. The wind varies in direction and intensity at different altitudes. The



Smoke clouds indicate hits and misses of salvo bombing by the 7th and 19th Bombardment Groups (circle). Below—A 300-pound demolition bomb crater at Muroc Lake.


DEVICE IN LEFT WING AILERON WHICH AIDED IN STABILIZING PLANE AFTER RIGHT WING WAS HIT BY BOMB
"FLETTNER CONTROL"
AILERON
PLANE NO.2 FLYING AT 9000 FEET BEING STRUCK BY BOMB FROM PLANE 3
PLANE NO.3 FLYING AT 11 000 FEET
PLANE FLYING IN ADVANCE DROPS PARACHUTE FLARE TO ILLUMINATE TARGET
DESIGNED COURSE OF BOMB
TARGET AS SEEN FROM HEIGHT OF 2000 FEET (IF PLANE WERE DIRECTLY ABOVE IT)
BATTLESHIP TARGET
ABOUT 5 MILES
TARGET AT 7000 FEET
AT 9000 FEET
AT 11000 FEET

Graphically illustrating the relative size of the desert target as seen from varying altitudes, this artist's sketch also shows how the plane piloted by Lieut. Harbold was struck by a bomb dropped from another plane high above it.

courses took the planes over mountains that varied greatly in altitude. Although all of the planes were of the same type, they had different cruising speeds at the same throttle setting. Hence, while a lag was provided between arrivals at the target, there was a possibility of the time interval being materially changed.

Plane number one completed its mission without any untoward incident. Number two, with Lieut. Norris B. Harbold as pilot and Lieut. William B. Stone as bomber, approached the target at its assigned altitude with both officers slightly perturbed. Harbold was having trouble with his engines and Stone was having difficulty in getting the pilot to stay on the proper bombing course. Stone, however, was able to drop his bombs with a fair amount of certainty that they would hit the target in the darkness below. Harbold was only too glad to know that the bombs had been released so that he could start home with his balky engines. Just at that time there was a terrific shock felt through the entire plane.

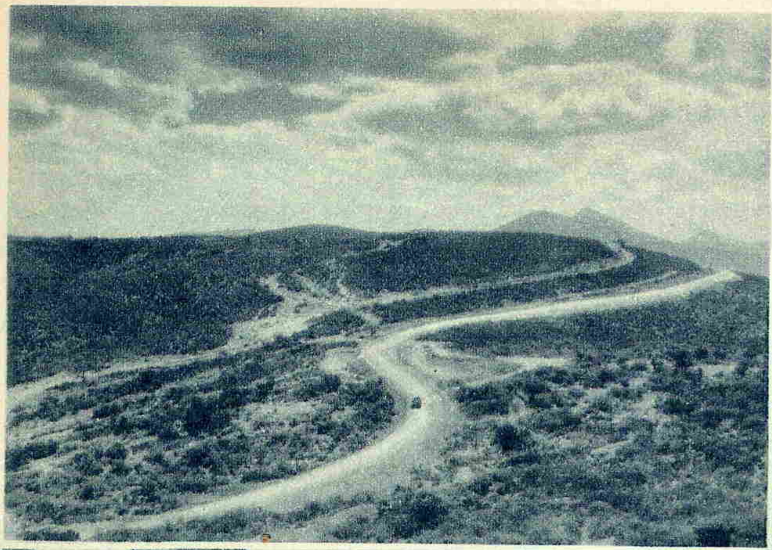
The right wing tip lights went out. The plane became extremely difficult to handle and keep on an even keel. It was only by the most skilful piloting that the plane was flown back and safely landed at March Field. Believe it or not, the "million to one chance" had arrived. The plane had been hit by a bomb dropped from the third bomber some two thousand feet above it. Furthermore, of all the bombs dropped that night, there was only one which did not explode and that was the one which went through the wing of the hapless bomber. Had it exploded there would have been nothing left of the plane, but pieces small enough to carry away in a basket.

The rabbit's foot that Lieut. Harbold carries is just about worn out now.

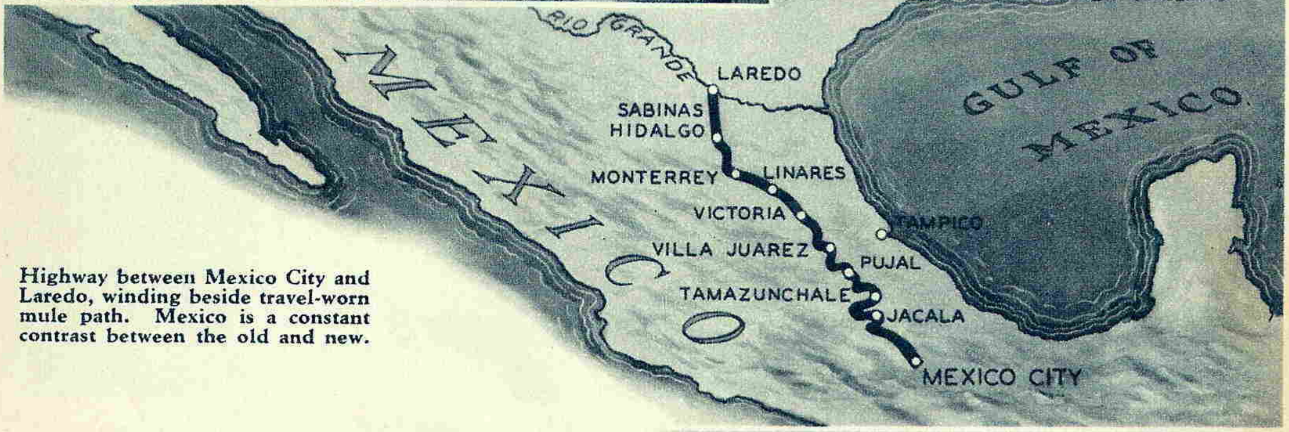
Note: Brig.-Gen. Henry H. Arnold, author of this article, was awarded the Distinguished Flying Cross for leading a flight of army bombing planes from Washington, D. C., to Fairbanks, Alaska, and return —18,000 miles of exceptionally dangerous flying.

SOUTH

A new highway lures the autoist "abroad," to the land of bull fights and senoritas.



Highway between Mexico City and Laredo, winding beside travel-worn mule path. Mexico is a constant contrast between the old and new.



MEXICO'S horizons, pierced with cloud-clustered peaks, today offer a new lure to the romantic motorist. That once almost inaccessible land of bull fights, quaint and colorful villages, ancient Indian ruins and winter bathing in crystal seas is now easy to reach by auto over the first link of the Pan-American highway from Laredo, Texas, to Mexico City.

Right now many automobilists are starting out for Mexico City. Some will do the 763 miles from Laredo in one long stretch of 20 to 24 hours' driving. Others will do it in two days and one night. Some will take five days. This last pace is best if you care for scenery and cherish your neck.

The traveler over the new road will traverse what is probably the most spectacular highway in the world. Aside from its scenic wonders and hair-raising thrills, the road is an extraordinary example of engineering skill. And at the end of the road lies Mexico City, an ideal resort with a true foreign atmosphere for Americans who want to flee winter's chill or summer's heat. Perched 7,275 feet in the mountains, the city has a delightful spring like climate the year 'round, with sunny days and cool nights.

Motoring to Mexico now requires little more red tape than crossing a state line. No passports are needed, and tourist cards, good for six months, can be had for a dollar. Cars must be bonded on entering the country, but the fee is only $1.50 for 30 days. All car equipment taken into Mexico, however, must be taken out again, and duty must be paid on every missing article. For this reason it is well to be sure that all tires are in good condition. If one wears out while you are down below the Rio Grande, you can't throw it away until you return to the United States.

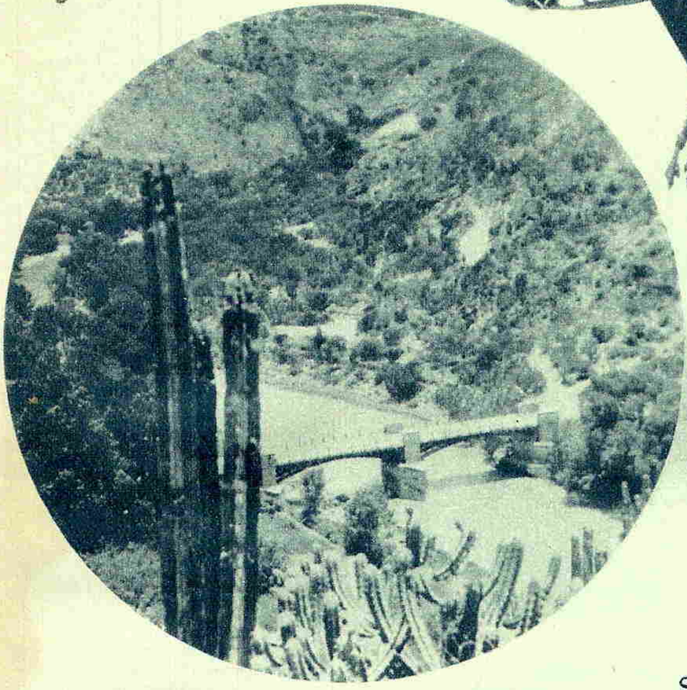
Tourist camp at Monterrey, in the heart of Old Mexico, is a little Spanish city in itself.

The first 100 miles from Laredo is through

To MEXICO

by
Robert W. Gordon

A pretty senorita on a horse is as common in Mexico as a deb in a coupe in the U. S. A.



One is always in or under mountains most of the way. This span links one range to another.

flat cactus and chaparral country, hot and monotonous, so take plenty of water for yourself and your car. But there is one stretch where the highway runs for 47 miles in a straight line. It is a perfect road and the driver who likes speed can quickly leave the cacti behind. Soon the crests of the Sierra Mountains loom ahead, like faraway clouds, and the climb begins into the foothills. A gorgeous panorama unfolds at Mamulique Pass, and from there it is an easy descent in the city of Monterrey—a gem of a city, the cleanest in Mexico, and full of interesting sights. Although only 145 miles from the border, it is an excellent place to spend the first night. It is not only a good introduction to Old Mexico, but it has even better hotel accommodations than Mexico City.

From Monterrey one will always be in or under mountains. The 181 miles to Victoria is through hilly country, but the road is well paved and in good condition. The highway passes through virgin country and in some villages near the road the Indians are learning to speak English.

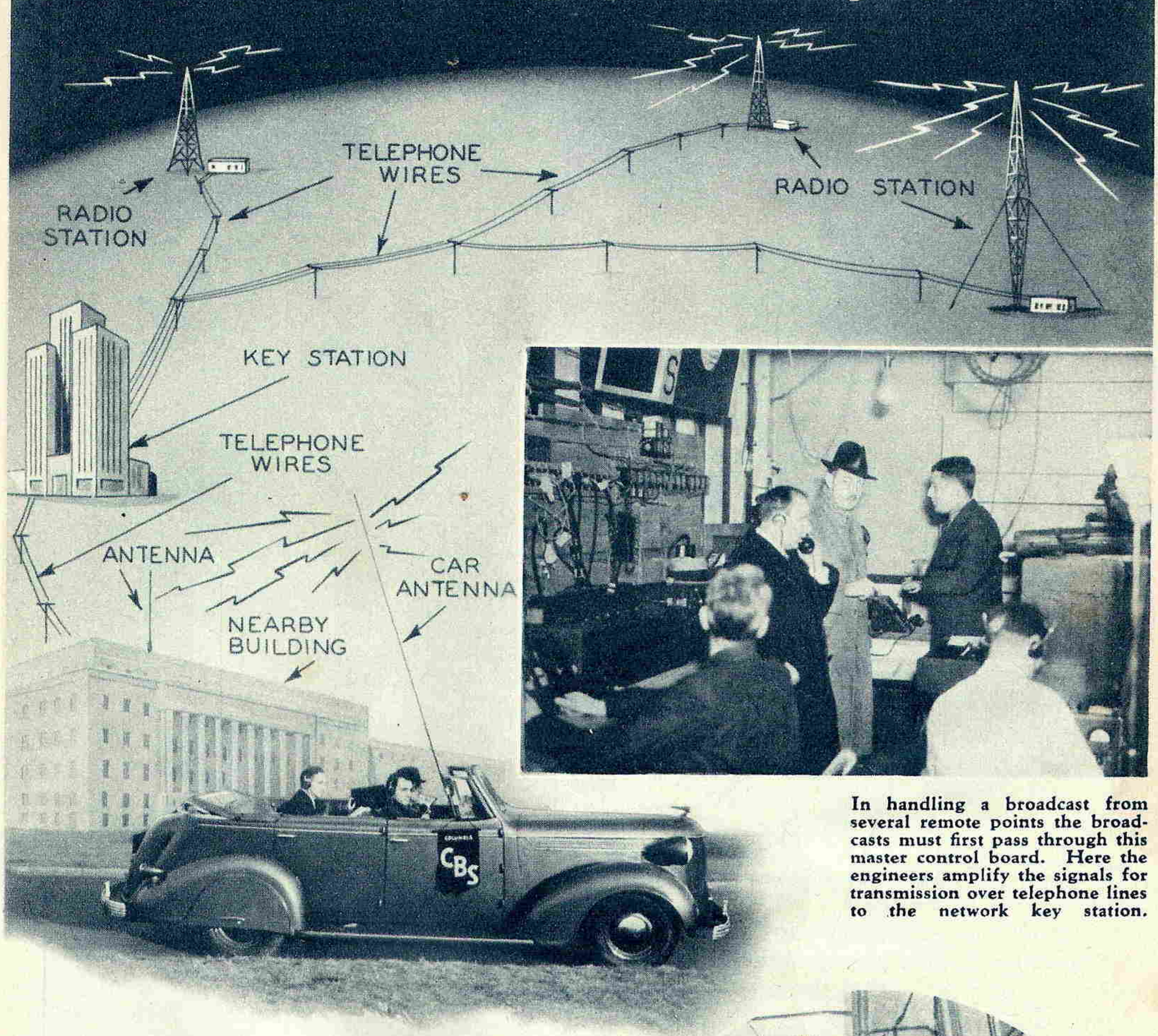
The climate this far is similar to that of Southern Texas. Just south of Victoria, the Tropic of Cancer is crossed, and with the road dipping into the lowlands again, there will be about 200 miles of real tropical heat. In the heart of the Indian country, virtually inaccessible until the Pan-American highway was opened, the parrots screech from their jungle perches at the invading motor cars chuffing into Tamazunchale.

Immediately upon leaving Tamuzunchale (pronounced Thomas an' Charlie by the gringos) the real climb into the Sierra Madres begins. In 20 miles the road ascends about 8,000 feet to a point overlooking the great Mesa Central, on which Mexico City lies. The 64-mile stretch to Jacala was the last part to be completed, and is still subject to slides. Known as the "Horror Stretch," this is no place for the nervous driver. For hours you seemingly ride on wheels in the sky, in a world of clouds—above them, through them and between them.

In places this road used to be a nine-foot wide mule trail, hanging over sheer gorges thousands of feet deep. Now at the curves it is 65 feet wide, with the outer edges balustraded. But it will always be dangerous

[*Continued on page* 136]

MOBILE STATIONS Broadcast Major EVENTS



In handling a broadcast from several remote points the broadcasts must first pass through this master control board. Here the engineers amplify the signals for transmission over telephone lines to the network key station.

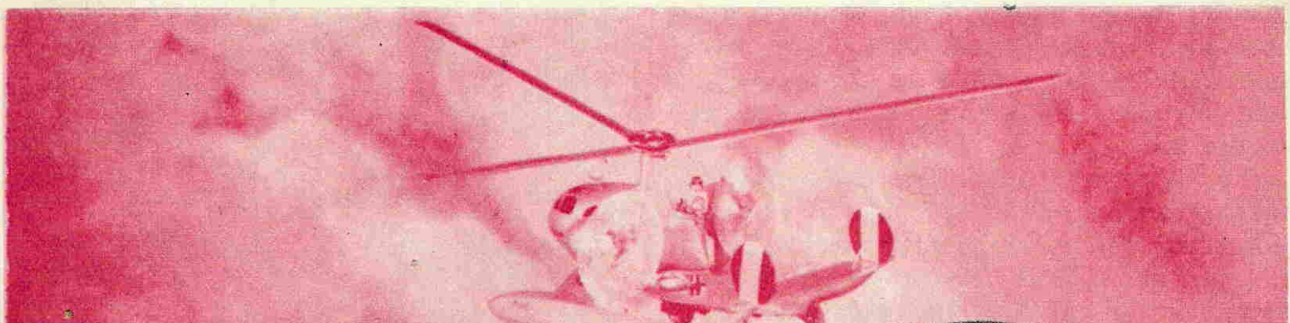
Signals transmitted by this mobile station are picked up by a receiver atop a nearby building, relayed to the key station and then distributed over telephone lines to the broadcasting stations throughout the nation which comprise the network.

HISTORY in the making is now brought into the homes of millions of American people through the use of mobile radio stations capable of broadcasting from the actual scene of any major event or catastrophe. Carrying broadcasting and receiving equipment, announcers and engineers, the mobile stations can rush to fires, flood areas, political and other events at a moment's notice.

While one crew of engineers rushes to the scene another group hurriedly sets up high frequency receiving apparatus atop nearby buildings for picking up the signals from the portable or mobile station. Special telephone lines then carry the announcer's voice to the key station where the broadcast is sent out to network stations throughout the country.

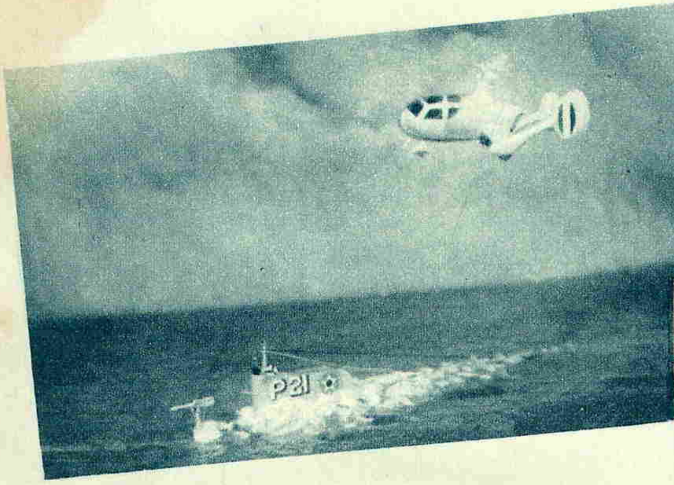
Equipped with "cue" transmitters similar to the one shown here, engineers are able to keep in constant touch with field technicians and announcers covering a broadcast. The "cue" transmitter is built in a trunk so that it can be set up anywhere.

Youth Models Naval Autogiros



Posed over a miniature fleet, this amphibian autogiro is Crawford's conception of the future Naval scouting aircraft.

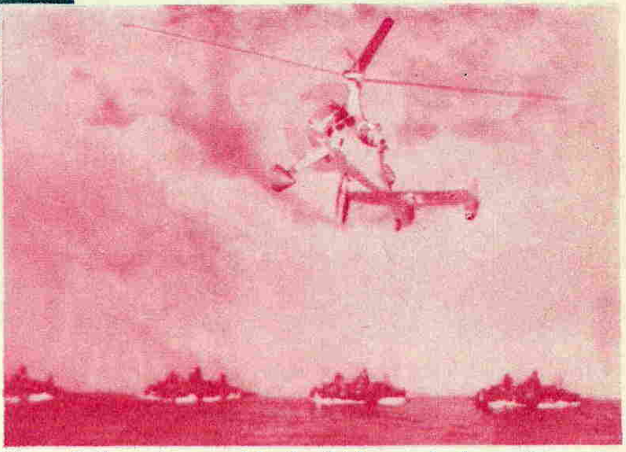
Robert Crawford, talented model aircraft designer.



Designed to be housed on the deck of a submarine, this autogiro model is shown in flight as its "mother" ship descends.

WORKING for an insurance company during the day, Robert Crawford, 19, of Philadelphia, Pa., built autogiro models at night which have won recognition from aeronautical engineers because of their potential value as the basis of designs for future Naval aircraft. The young aviation enthusiast has constructed three models of wingless and amphibian autogiros, the prototypes of which have never been built by any aircraft firm.

The three models, built to a scale of 1 to 30, required six months each to build. One of the models, fitted with two engines, pontoons, and wheels, is classed by Crawford as the future Naval observation amphibian autogiro.



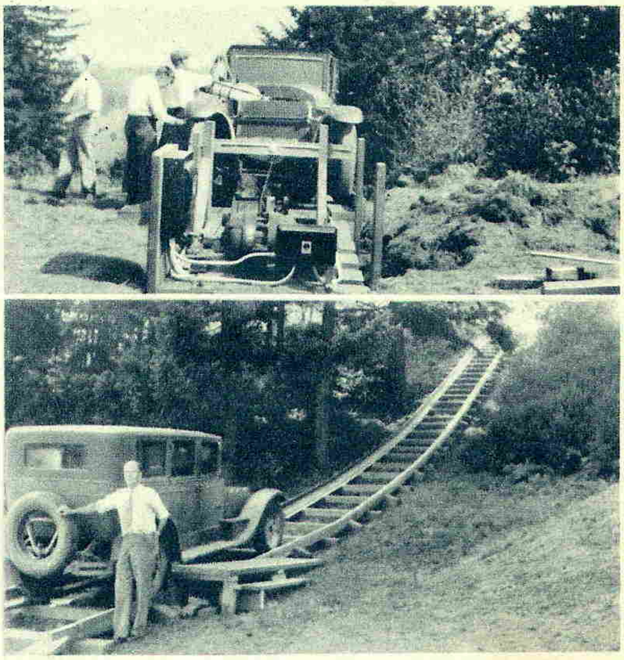
Pictured above is a model of a high speed observation autogiro equipped with four machine guns. Note observer at gun.

The smallest model represents a submarine scouting giro designed to be housed on the deck of an underseas craft. Testing his models in a wind tunnel, Crawford has worked out specifications and performance figures applicable to real autogiros built from his designs.

Tramway Saves Golfers 70-Foot Climb To Tee

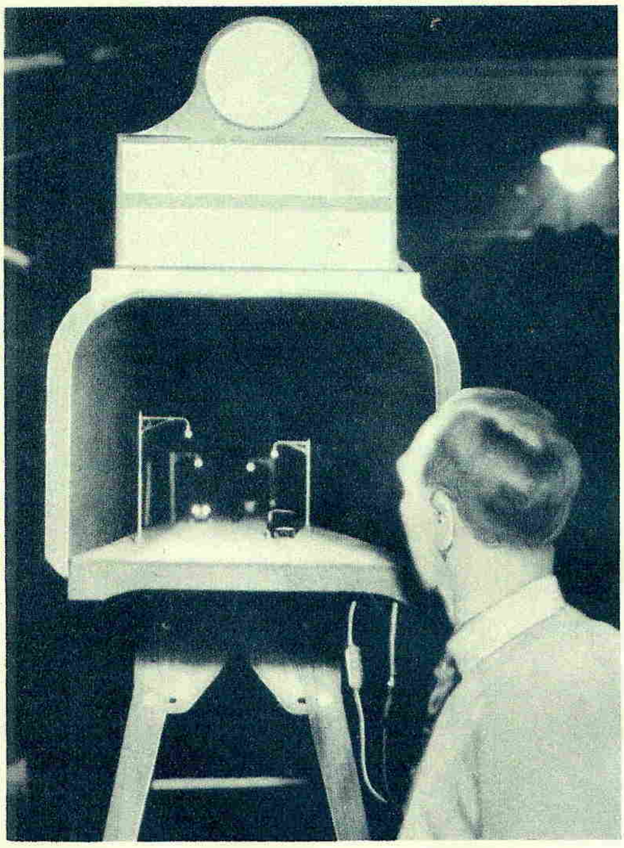
TO ELIMINATE a 70-foot climb between the 11th green and the 12th tee at the Oswego Lake Country Club, Oswego, Ore., Manager Walt Kerry constructed a tramway using an old automobile as the conveying vehicle and an electric motor to pull the car up the hill.

A push button system of the same kind that is used on automatic elevators is operated either from the top of the hill or at the bottom. A seven-and-a-half-horsepower motor, connected to the car by a one-half-inch cable, pulls the car to the top and lowers it to the bottom.



Top—Golfers leaving car after ride up hill to tee. Below—Oswego Lake Country Club Manager Walt Kerry beside remodeled car used for eliminating 70-foot climb to 12th tee.

Model Shows Safe Lighting



Safety principles in highway lighting are demonstrated by this model highway lighting system. The miniature equipment illustrates defective lighting danger to pedestrians.

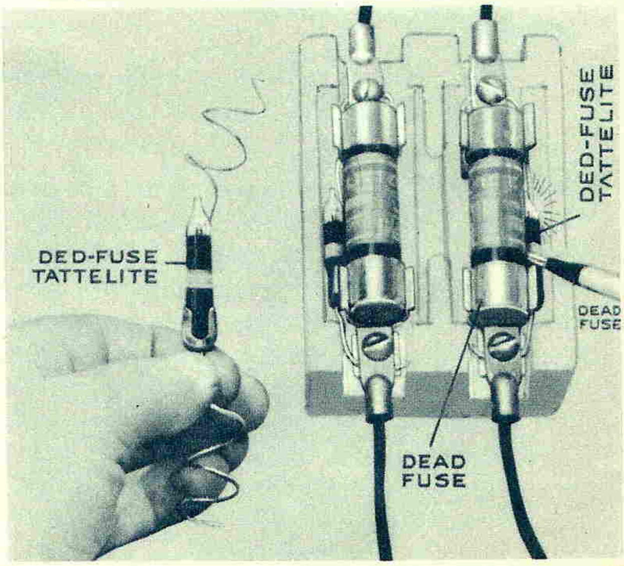
A PORTABLE model highway, with tiny automobiles, pedestrians and highway lights, is used by General Electric Company engineers to illustrate safety principles involved in highway lighting.

The miniature lighting equipment demonstrates how a well lighted system reveals pedestrians clearly by silhouette under conditions in which automobile headlights are dangerously ineffective.

Bulb Indicates Blown Fuse

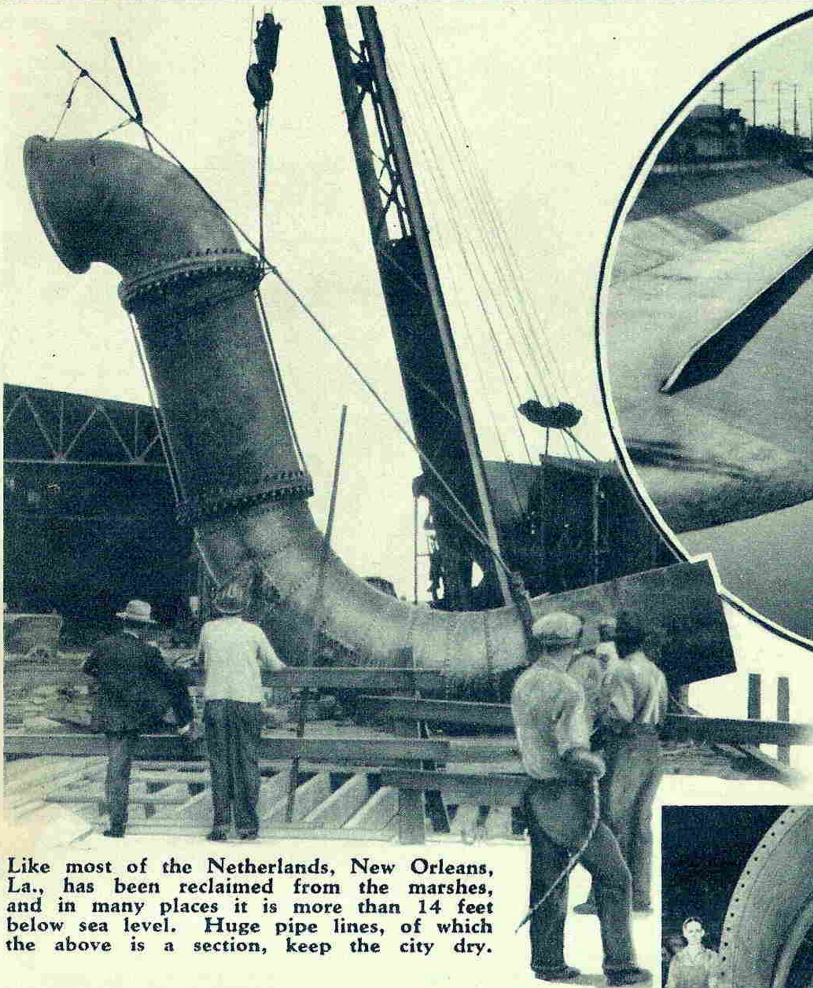
DIFFICULTIES of locating blown fuses are eliminated by a tiny neon lamp connected in the circuit. When a fuse blows, an open circuit is created which causes the bulb to light near the defective fuse.

The neon bulb glows until the fuse is replaced. With such a signal it is possible to spot an open circuit without time lost in making detailed tests.

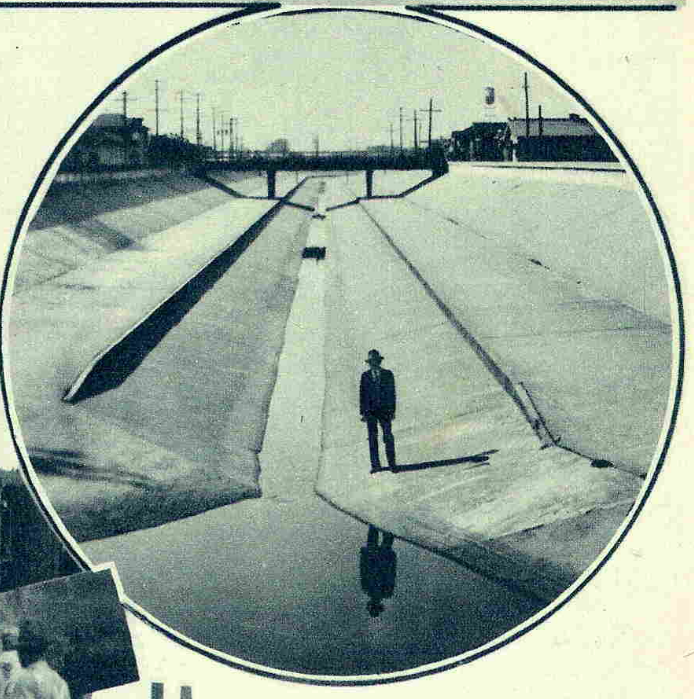


Tiny neon lamps connected to fuses indicate by glowing, location of blown fuse. Remaining lighted until defective fuse is replaced, necessity for making detailed tests is eliminated.

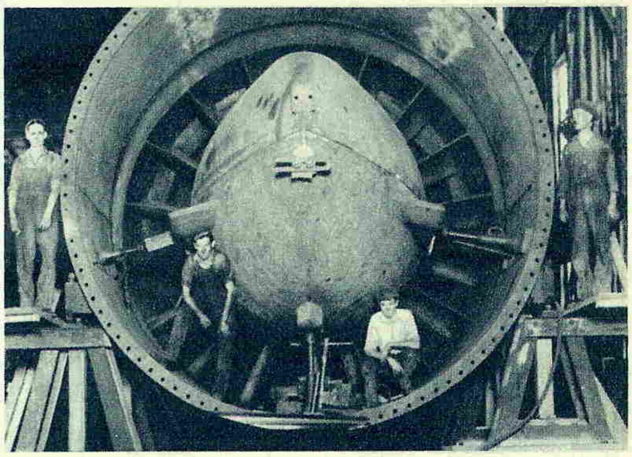
Draining New Orleans Flood Bowl



Like most of the Netherlands, New Orleans, La., has been reclaimed from the marshes, and in many places it is more than 14 feet below sea level. Huge pipe lines, of which the above is a section, keep the city dry.



During the flood season, New Orleans assumes the appearance of Holland, with her concrete lined canals filled to the brink. Photo shows construction of canal.



No windmills are used to keep New Orleans dry. Water from the canals is passed through huge knives to cut up trash and is then drawn through the discharge pipes by this propeller.

HOLLAND, constantly waging war against an encroaching sea, has long excited the admiration of engineers and tourists alike with its network of canals and pumping stations. But in New Orleans, La., the same battle, occasionally intensified by sudden risings of the Mississippi river, has been going on for years with little or no public attention. Quietly New Orleans has constructed her canals, pipe lines and pumping stations until now her drainage system is rated as one of the most efficient in the world.

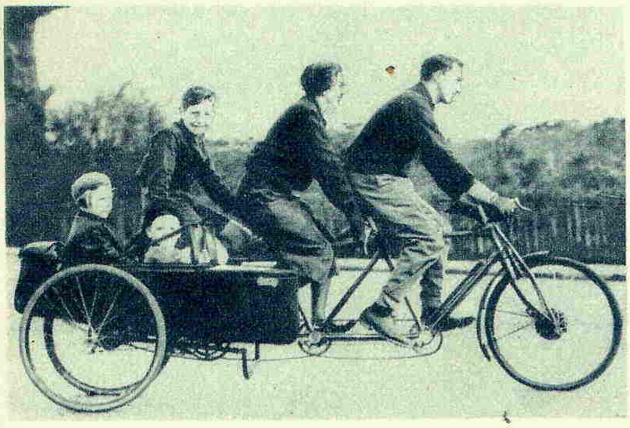
New Orleans lies like a saucer between the Mississippi River and Lake Pontchartrain, a huge salt water inlet. In many places her city streets are fourteen feet beneath the level of these bodies of water.

The two largest pumping stations in the world are among the six that handle the city's unique drainage problem. Many of the pumps in these stations have a capacity of 1,000 cubic feet per second, and the water gushes through outlets fourteen feet in diameter—also the largest in the world. There are 796 miles of these pipelines, and 127 miles of open canals, carrying the excess flood waters out of the city and into the lake. One of the six stations has a capacity of 5,000 cubic feet of water per second; the stations work in relays, one pumping the flood stream to the other until the final drainage has been accomplished.

The pumps are operated by electric motors

[*Continued on page* 138]

Bicycle Built For Five Carries Entire Family



The bicycle built for two has been forced into retirement by the Saunders family of Norfleet, England, who are shown taking an afternoon jaunt in this bicycle built for five.

GOING the bicycle built for two one better, the Saunders family of Norfleet, England, use this bicycle built for five.

Twelve feet long, the three-wheeled affair carries father and mother, Mr. and Mrs. S. Saunders, and son Victor, 10 years old, as motive power, and Patricia, 6, and Michael, 3, as non-working passengers. Cost of operation is about one shilling (25 cents) a week.

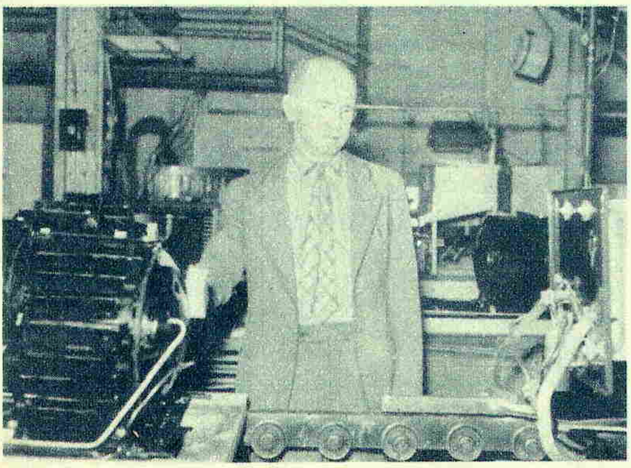
Suggestions Earn $1,100

WILLIAM JANSEN, an employee of the General Electric Company, has earned more than $1,100 more than his salary by suggesting innovations at the company plant at Schenectady, N. Y.

Individual awards for more than 30 accepted suggestions have varied between $5 and $200. While working in the turbine department, fifteen years ago, he watched fellow employees scrape the rough edges from turbine blades.

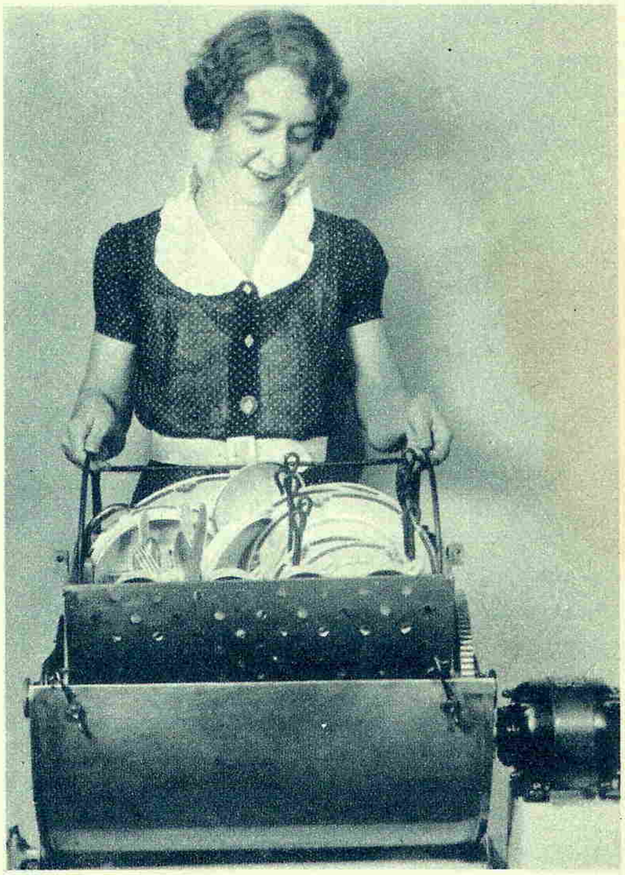
The next day he returned to the shop with a suggestion—a mechanical device to relieve the workers of what he called "a back-breaking job." For that suggestion the company gave him $75.

His largest award came several years ago when he suggested a flame of oxygen and illuminating gas instead of acetylene for silver soldering. The company paid him $200.



William Jansen shown at his work where he has earned more than $1,100 for suggestions made to his employer. Individual awards have varied between $5 and $200.

Dishwasher Aids Housewife



With power supplied by a small electric motor, this dishwasher cleans an entire filling of dishes in eight minutes and uses but six quarts of water. Stationary dish holder prevents breakage.

AN ELECTRIC dishwashing machine which uses six quarts of water, cleans all the dishes in the machine in eight minutes. Taking up but little room in kitchen, the mechanism is simple enough to be operated by a child.

The dishes are placed in a basket which in turn is placed in the machine. The basket is self-locking, and stationary during the washing operation, thus eliminating all chance of dish breakage. An agitator with four blades revolves around the perforated basket, forcing the water upward between and over the dishes. The water strikes the dishes at all angles, doing a thorough and sanitary job.

Device Quickly Determines Dust Content Of Room

A DUST counter, providing an easy, accurate and dependable means for measuring the dust concentration in a room, now is being offered for sale.

Consisting mainly of an air sampling device and a dust counting miscroscope, the apparatus does not require extensive laboratory training or experience by the operator. The air sampling mechanism consists of a moistening chamber through which the air is drawn by means of an accurately calibrated hand pump of 1/1000 cubic foot capacity, and an impinging device which deposits the dust particles suspended in the air on a circular glass plate within the instrument.

The dust deposit is in the form of a ribbon. The samples may be viewed and counted at once without removal. Also they may be preserved for future reference simply by sealing a glass cover to the slide.

By means of a rubber bulb, the air moistening chamber is quickly cleared of any air left from previous sampling or exposure.

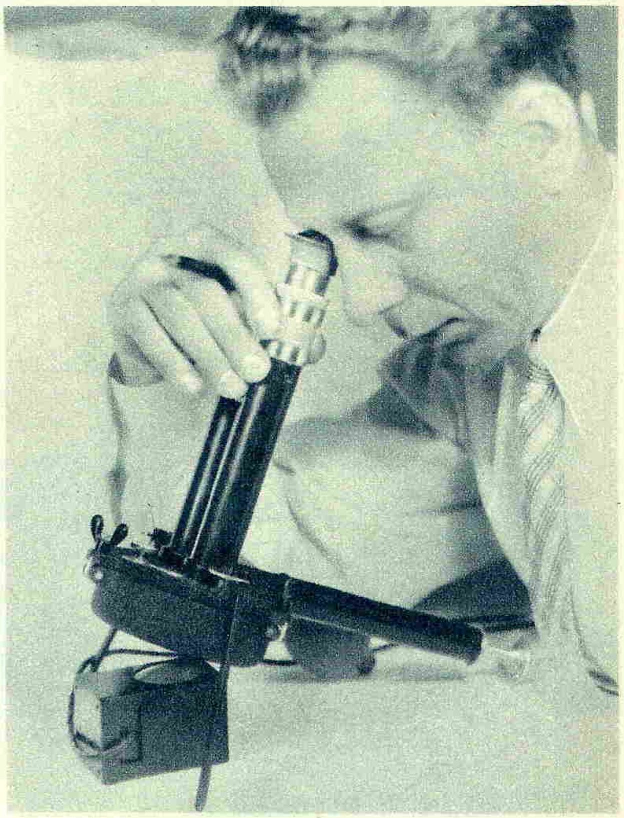
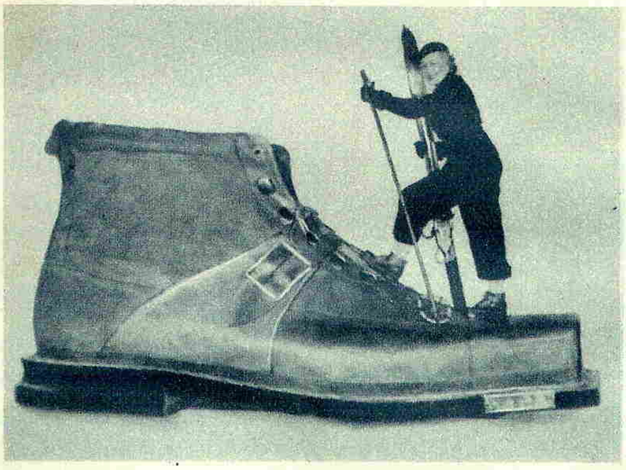


Photo shows new dust counter in use. Accurately calibrated hand pump draws air into chamber for inspection. Rubber bulb shown clears chamber of air left from previous sampling.

Ski Boot Weighs 1,200 Pounds



Hazel Pickford, model, stands on Gargantuan ski boot which measures 13 feet in length. Miss Pickford's feet, insured for $50,000, wear a smaller variety of the larger boots shown.

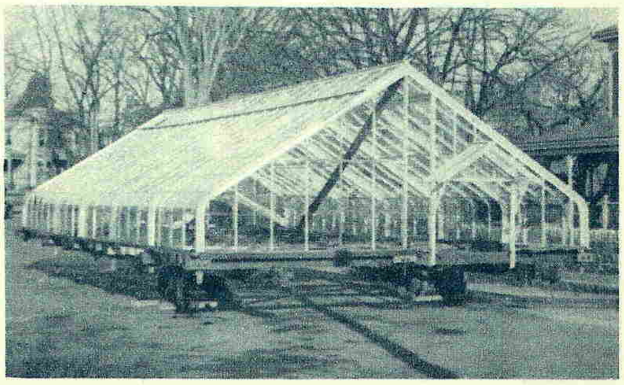
A GARGANTUAN ski boot, size 371, took six weeks to make and is an oversize duplicate of the type worn at fashionable winter sports resorts in the United States and on the Continent.

Built for exhibition purposes, the boot measures 13 feet in length and has six eyelets, eight hooks and the laces are of mountain rope. The heel is 35 inches wide and 40 inches long. The entire boot weighs 1,200 pounds.

Greenhouse Moves 5 Miles

MOVING a glass greenhouse a distance of five miles with but two broken panes as the result, was the record of B. F. Goodwin of Marblehead, Mass.

The greenhouse was towed on a wooden framework set on wheels. Examination of the broken panes disclosed that they broke because they had not been puttied securely. The house measures 25 by 48 feet and is 17 feet high.

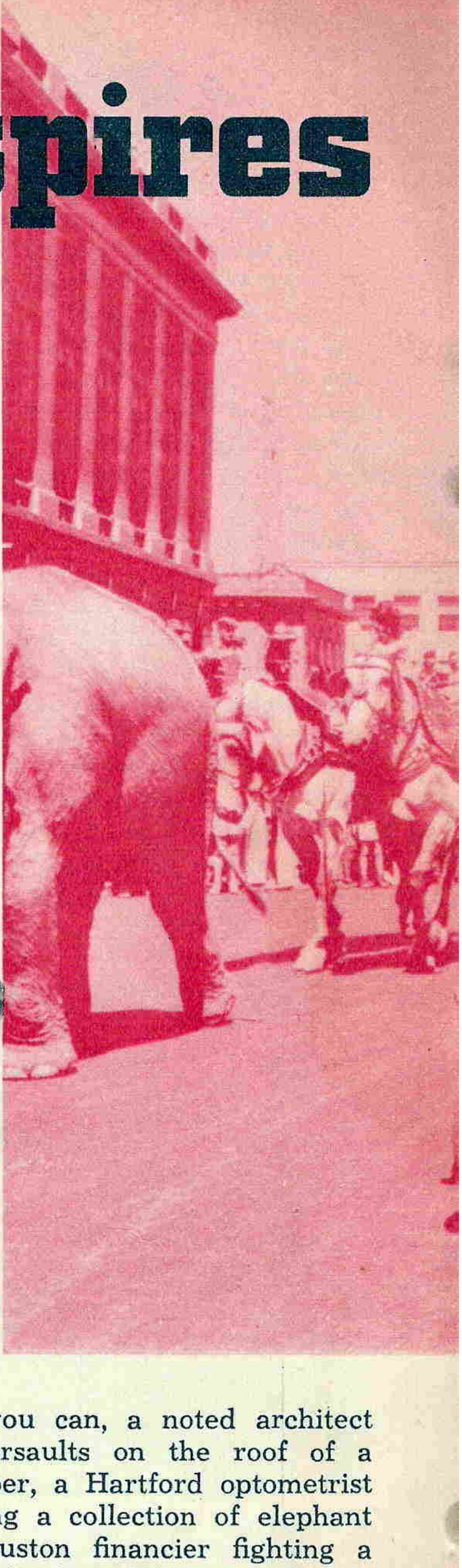


Greenhouse mounted on wheels ready to take a five-mile ride to new location. At end of trip, but two panes of glass were found to be broken. Damage was caused by faulty putty work.

CIRCUS Inspires

Men who have never outgrown the lure of the "Big Top" express their fascination in unusual pastimes.

by A. Morton Smith



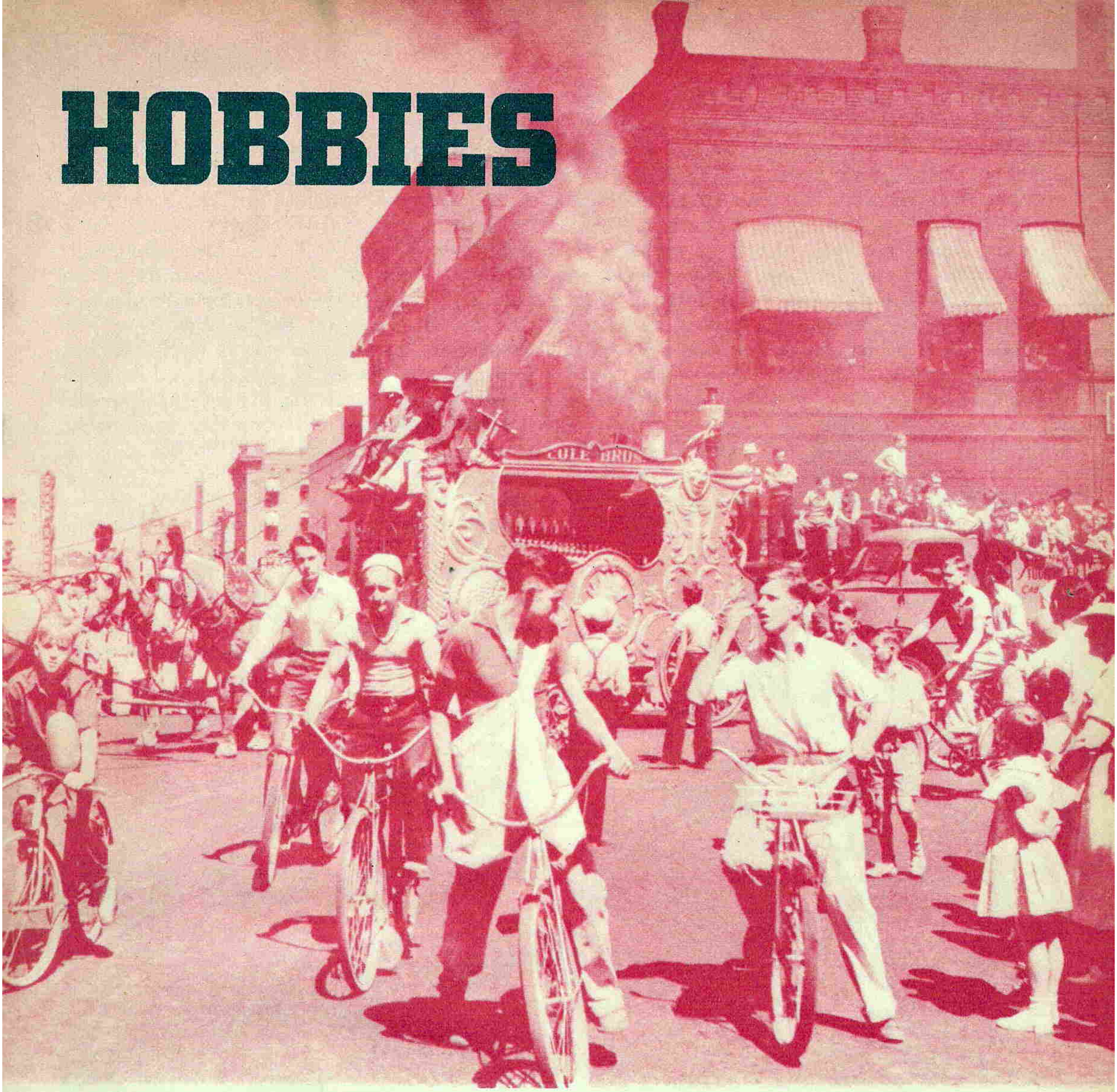
Frank J. Walter (left), a Houston, Texas, financier, has risked his life many times while indulging in his animal training hobby. On one occasion, a lioness sank her fangs in his arm, paralyzing the nerves for an entire year.

PICTURE if you can, a noted architect turning somersaults on the roof of a Chicago skyscraper, a Hartford optometrist proudly exhibiting a collection of elephant tail hairs, a Houston financier fighting a ferocious lion on the front lawn of his home, or a San Antonio lawyer pursuing an elusive top hat halfway across the continent.

This is not the story of a world turned topsyturvy. It is about sane, successful business men and their favorite pastimes, odd as they may be. All of them have to do with that grand old American amusement institution, the circus, which has inspired a great variety of curious hobbies.

The circus hobby riders are youngsters of another generation who abandoned

HOBBIES



Circus Days! Few men have outgrown their boyhood fascination for the traveling circus with its clowns, freaks, trapeze artists, and wild animal acts. Above—Thrilled youngsters follow the Cole Brothers-Clyde Beatty Circus as it arrives in a mid-western town.

their childhood fancies for business and industry, but who have never overcome the lure of the big top and the joys of circus day.

Oddest of these hobbies is that of Charles E. Davis of Hartford, Connecticut, who boasts of a collection of tail hairs from 104 elephants, all neatly tied with thread and kept in envelopes labeled with the names of the animals in alphabetical order.

Davis ran away with a circus at 14, found elephants absorbing, and after establishing himself as an optometrist in his home town, began the task of compiling elephant biographies. So engrossed did he become in his research work that he wanted a memento of each of the big beasts and hit upon the idea of collecting tail hairs. He prizes highly the tail hairs of a baby elephant which died at birth in 1917. Old Mom, heroine of many circus stories, gave up half of her hair to his collection for her keeper found but four hairs on her tail. And John, the leader of the Ringling Brothers herd, minus a single tail hair, is represented by several of his unusual red chin whiskers.

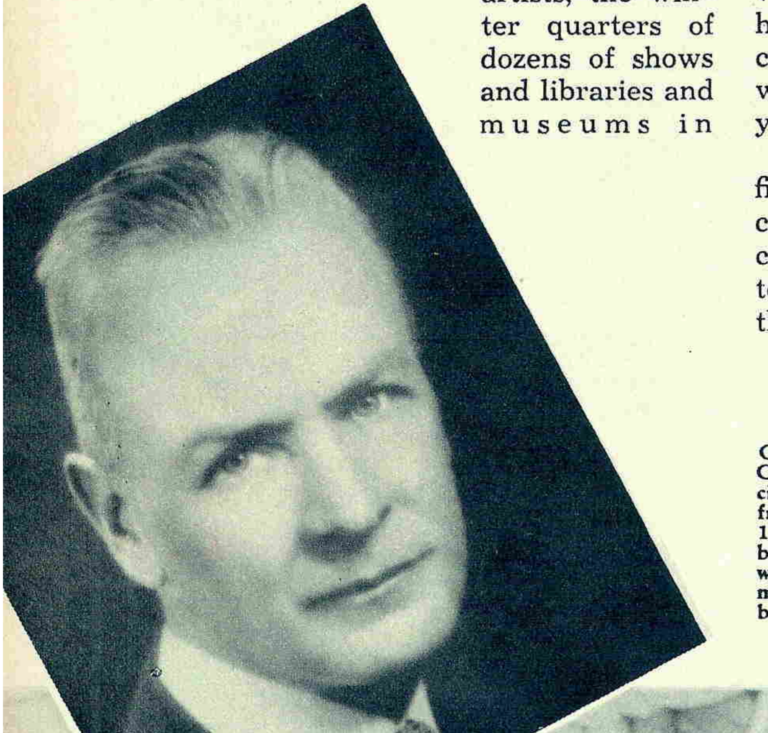
Perhaps the largest of circus collections is that of Harry Hertzberg, San Antonio, Texas, attorney. The last census of his circus museum revealed 30,000 items ranging from posters of Rickett's Circus, which was attended by

George Washington and was the first show of its kind in America, to the battle-ax of the wild man from Borneo and the tiny coach in which Tom Thumb rode.

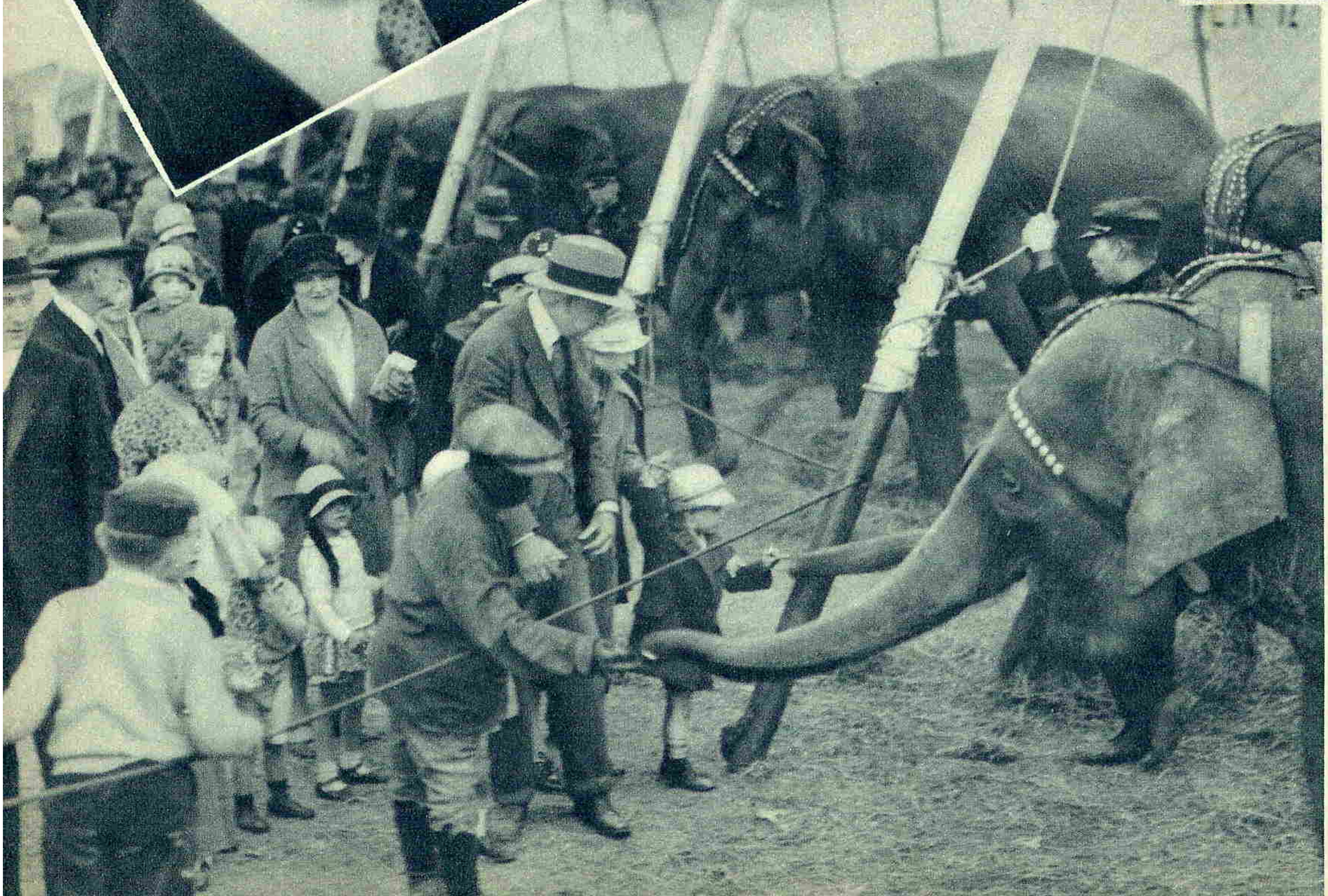
To acquire such an imposing collection which includes programs, posters, heralds, route books, personal effects of performers, hundreds of autographed photographs of circus artists and thousands of other articles, Hertzberg has pursued his hobby the nation over. He has visited the birthplace of circus owners and artists, the winter quarters of dozens of shows and libraries and museums in quest of rare articles. Once he dashed half way across the United States to obtain a top hat for his extensive collection of the personal effects of Tom Thumb, the midget discovered and exploited by the late Phineas T. Barnum.

Other hobbyists concentrate their efforts on particular phases of circus lore. Benjamin Perkins, head of a Boston manufacturing company, collects steam and air calliopes and delights in fingering the keyboards of his favorite instrument. Colonel C. G. Sturtevant, former army officer, of San Antonio, has devoted himself to circus history, has several hundred volumes and scores of scrapbooks containing practically every article dealing with circus history printed in the past 50 years.

John P. Grace, who manufactures electrical fixtures in Kokomo, Indiana, meticulously compiles circus statistics. He has on file, the complete routes of some 315 circuses that have toured this country since the 60's, along with the number of vehicles in the entourage, the



Charles E. Davis (left), a Hartford, Conn., optometrist, has the most unique circus hobby of all—collecting tail hairs from elephants. He has specimens from 104 of the huge animals and, as shown below, never fails to visit the elephant pit when a circus arrives in town. Right—A miniature circus cage wagon and horses built by J. W. Taggert, of Rockford, Ill.

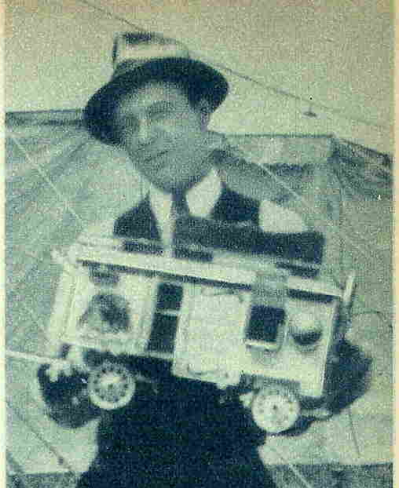


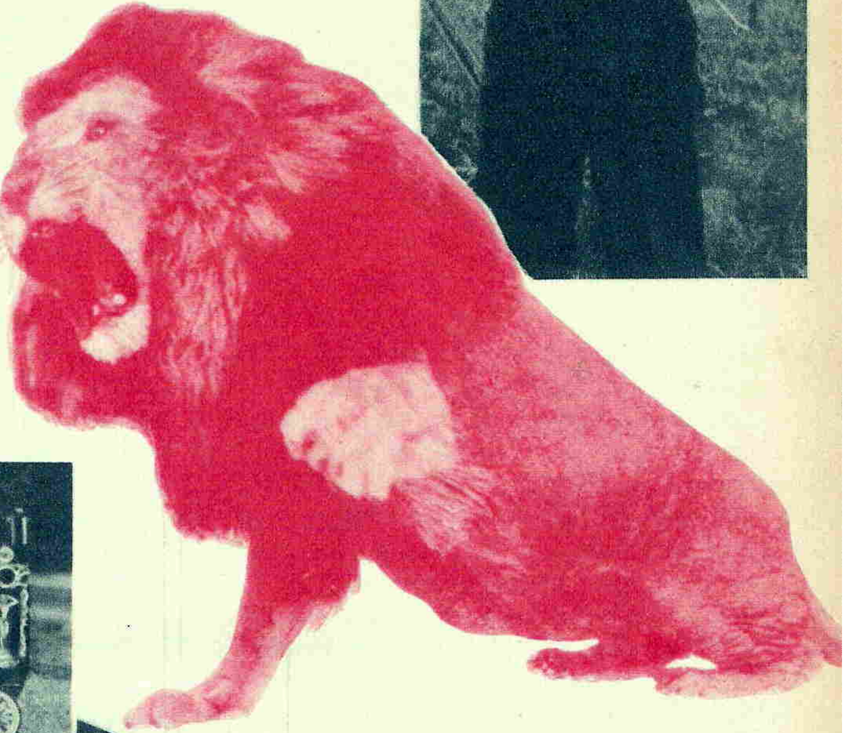
sizes of the tents, the number of persons with the shows and other salient facts about physical equipment. Not infrequently, circus executives write and telegraph him for information about their own show, which their records fail to reveal, but which Grace maintains as a labor of love.

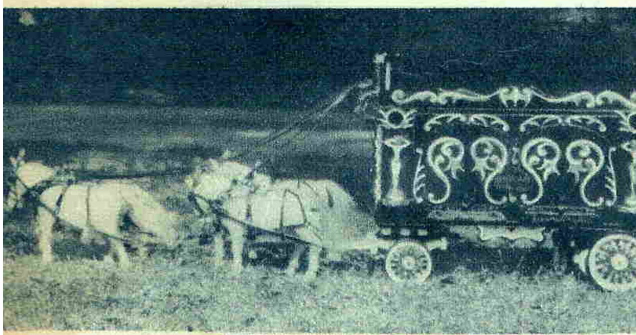
Sverre O. Braathen, Madison, Wisconsin, attorney, and Mrs. Braathen have a summer home, White Tops, which fairly radiates circus atmosphere. It is entered through a canopy of red and white striped canvas. A queen's throne from a tableau wagon is the divan in the living room. The chandelier is a sunburst wheel from a band wagon, a globe in each of the 14 spokes. The floor is green to represent the circus lot, and three circular red rugs suggest the three-ring arena.

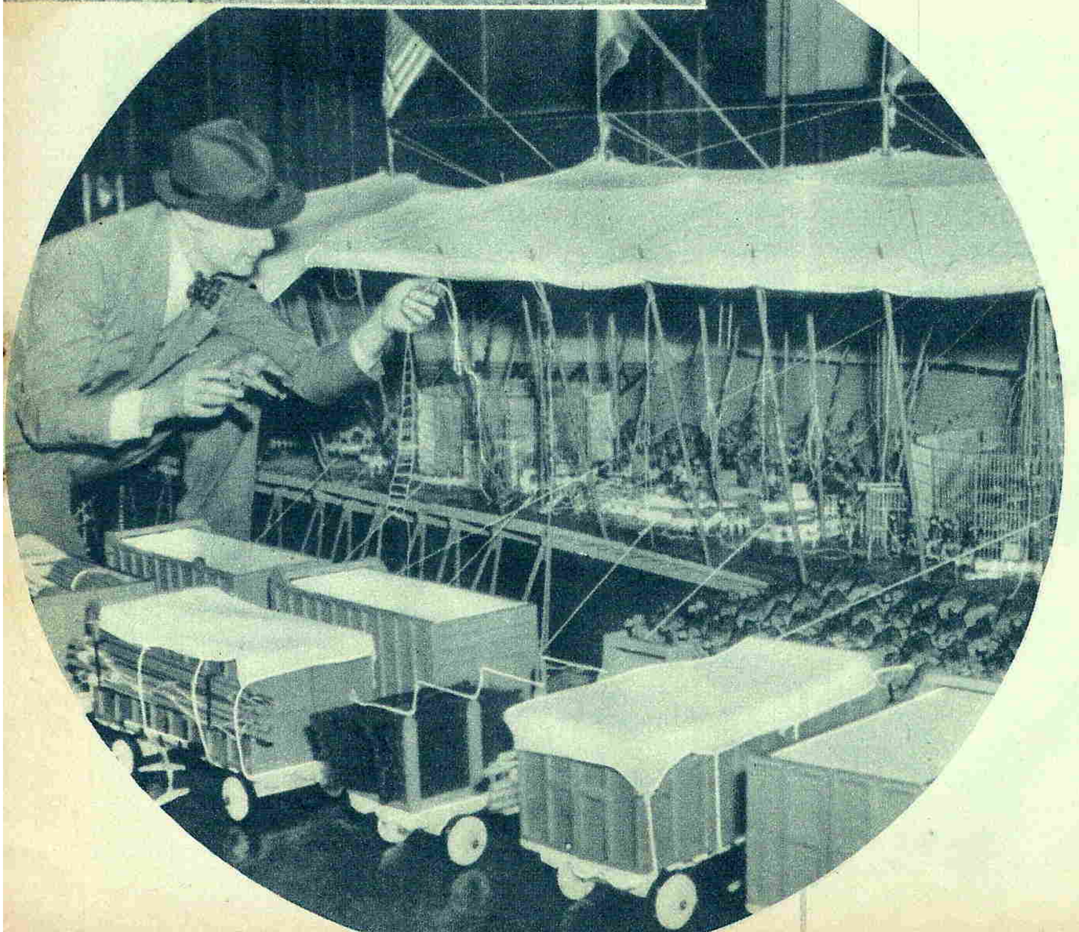
The Braathens' contribution to circus literature is a history of the Ringling brothers, which they are compiling from files of newspapers of the past 50 years and from data and material in the State Library in Madison.

Several circus fans follow their hobbies in the sawdust ring



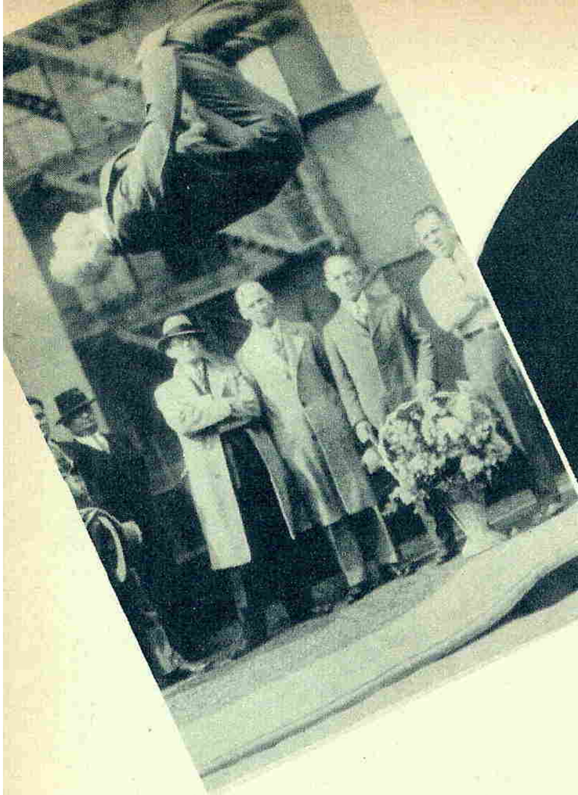






Top photo—Joseph W. Taggert, a Rockford, Ill., jeweler, shows a model ticket wagon which is part of his marvelous miniature reproduction of the Ringling Brothers-Barnum & Bailey Circus. Exact in every detail, the miniature wagon represents hours of painstaking labor. An admiring throng of circus professionals greet Taggert whenever he visits their tents to show his models.

George H. Barlow, 3rd (circle), of Binghampton, N. Y., proudly displays his miniature "big top". Composed of 100,000 parts built to a ⅝ths inch scale, the tiny circus required ten years of spare time work before it was completed. The display is accurate in every detail even to individual seats for spectators. Unlike other hobbyists, who can usually obtain their parts at model shops, those who make miniature circuses must create most of the parts from odds and ends, a job requiring infinite skill and patience.



Irving K. Pond, a Chicago, Ill., architect (circle), was inspired to take up gymnastics by a circus tight rope walker when he was a boy of five. Since then, to celebrate every birthday, he has demonstrated his physical prowess by executing a dozen forward and backward somersaults. In the photo at the left, the architect is shown doing his somersaults upon the occasion of his 77th birthday. He attributes his good health to his practice of the acrobat's art.

itself. Harper Joy, Spokane, Wash., investment banker, annually spends his vacation traveling with a circus as a clown. He rides in a stateroom aboard the circus train, as do the stars of the big tops, takes along his trunk of clown costumes, and when the horde of jesters files into the tent, Harper Joy, the banker, is just another clown, taking the bumps and making funny faces for the amusement of the kiddies, yes—but principally for his own satisfaction.

Frank Portillo, government printer in Washington, D. C., is another devotee of clowning. He spends a day here and there as guest clown and in the past five

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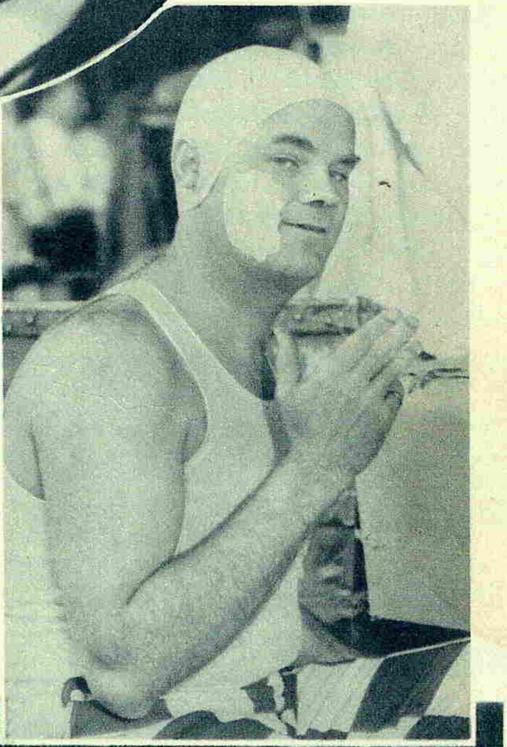


Harper Joy, a Spokane, Wash., investment banker, spends his annual vacation traveling with a circus as a clown, just for the fun of it. In these photos he is shown applying make-up and posing (in checkered garb) with a group of Sells-Floto Circus funmakers.

Super-Sound May Provide Fog Elimination Means

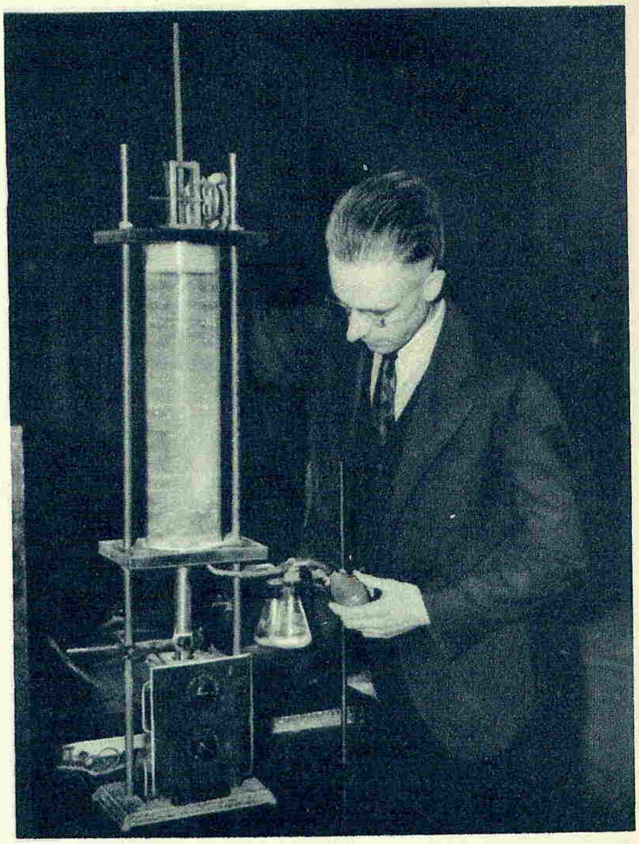
OPENING a new field pointing toward the elimination of fog, H. W. St. Clair, U. S. Bureau of Mines metallurgist, has invented a device which cleanses air of smoke and fumes by a super-sound process.

Developed as a means of settling smelter fumes by means of acoustic waves, the present device precipitates smoke in snowlike flakes.

Demonstrated recently before the American Institute of Mining and Metallurgical Engineers, the new "fog shaker" offers possibilities of clearing fog over airports and ocean by literally screaming them out of existence with intense sound waves.

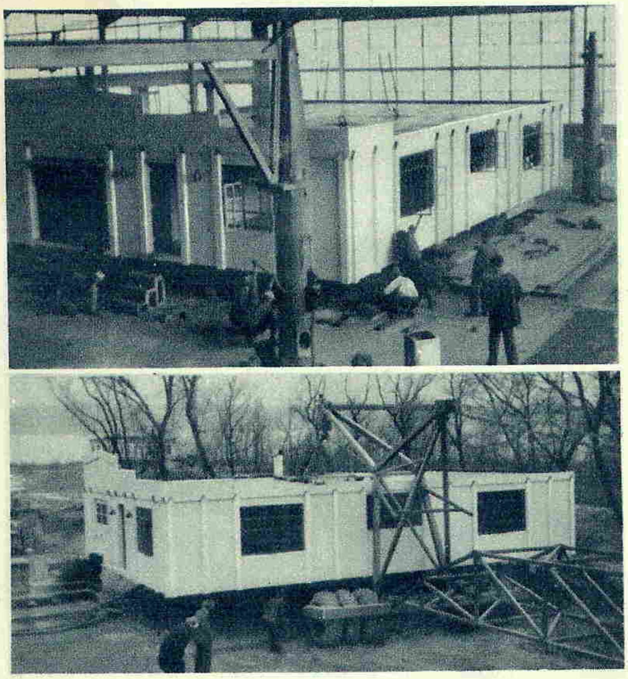
The immediate practical application of the device is for use in smelters, to recover metals going up the chimney as smoke.

The sound waves most suitable for use are those in the audible range.



H. W. St. Clair is shown demonstrating his device which may result in elimination of fog over airports and ocean by means of a super-sound wave. Device precipitates smoke into flakes.

Factory Builds Steel Houses



Ready for occupancy, this all steel factory built house is moved to its site by trailer. The first of a series, others will be constructed for R. G. Le Tourneau employees.

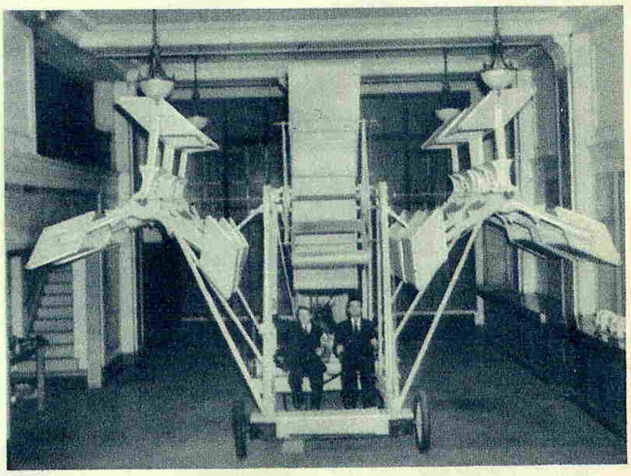
BUILT complete, decorated, ready to move into, a full size five-room electrically welded steel house with garage, recently was mounted on a semi-trailer and rolled out of the R. G. Le Tourneau grading machinery plant at Peoria, Ill., where it was constructed.

This is the first of a series of homes to be built for company employees.

Airship Has Unique Design

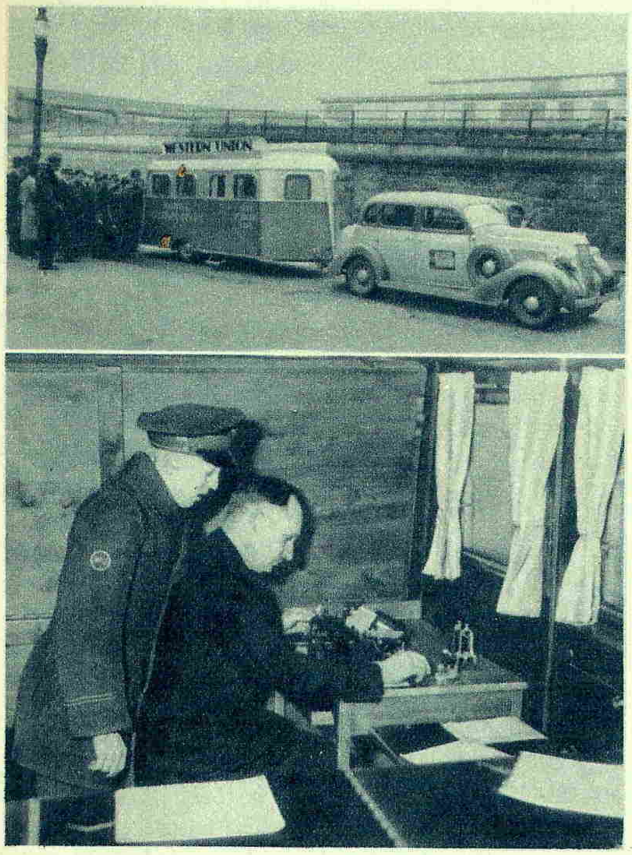
AN AIRSHIP having no wings, tail or propeller has been designed by Henri Van Zandt and Louis Chiquet. Called the "Aerial Phantom," it is said to offer the hope of revolutionizing aircraft design.

The machine is claimed to exert a lifting force of 50 pounds per horsepower.



Airship designed by Henri Van Zandt and Louis Chiquet has no wings, propeller or tail. Called the "Aerial Phantom," it is said to offer the hope of revolutionizing aircraft design.

Telegraph Office Moves To Emergency By Trailer



Telegraph office ready for operation moves in trailer to scenes of emergency. For use by newspapermen and the general public, equipment was developed by western company.

TRAILER telegraph offices that can be rushed to the scene of major news events for use by newspapermen and the general public have been developed by the Western Union Telegraph Co. The mobile offices can operate at any point where wire facilities are, or can be made available.

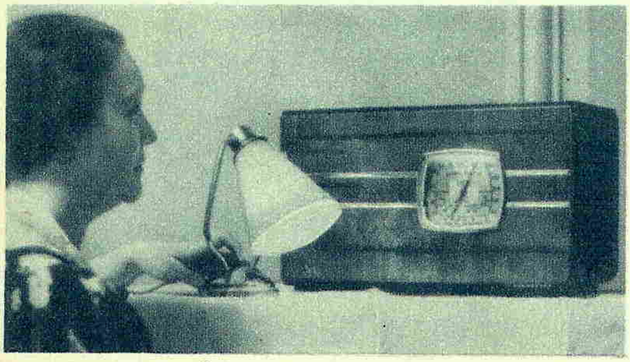
The trailer interiors provide writing desks for customers, a counter, and telegraphic equipment for both automatic and Morse operations.

To attract attention the trailers are painted with an aluminum roof and blue bodies. The words—"Mobile Telegraph Office" and "Send Your Telegrams Here"—are painted in large yellow letters.

Listeners Applaud Program

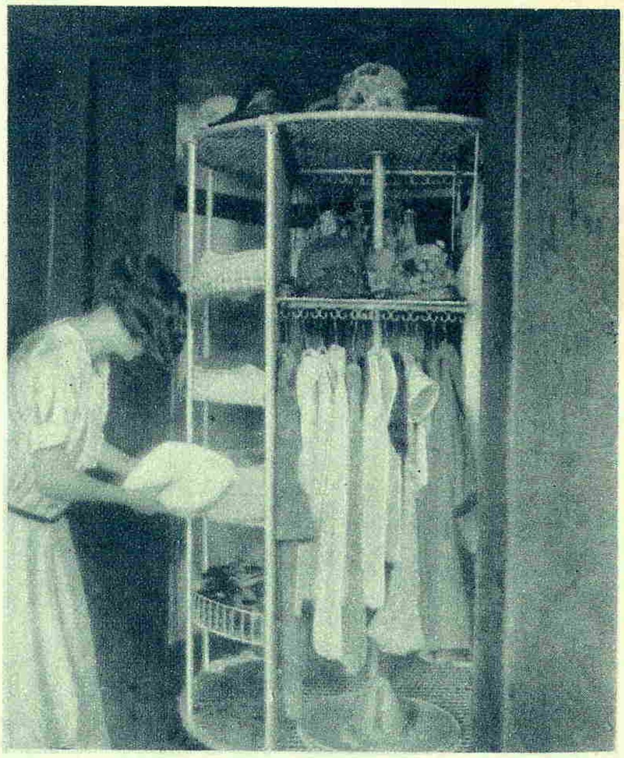
BY PRESSING an electric switch, radio listeners may express approval of a current radio program. Holding down a small switch attached to the base of a small lamp placed near the radio, the increased current drain is shown at the local power plant or substation.

Now being used in France, the idea was first tried out by an American power company working with an eastern broadcasting chain.



French radio listener presses button to applaud program just completed. Increased current drain of pre-determined value shows at power house or sub-station as total power increase.

Turning Closet Aids Family



Revolving clothes hanger moves to bring desired article to the person. Turning on casters, rack brings dark corners into easy reach and eliminates groping in the dark.

REVOLVING clothes closet utilizing the full volume of the compartment in which it is installed, enables the housewife to secure any article in the closet without groping in the dark.

In addition to being supported by the central shaft, the revolving rack is balanced in its turning by casters placed around the outside of the base.

SANITARY ENGINEERS TACKLE LARGEST JOB

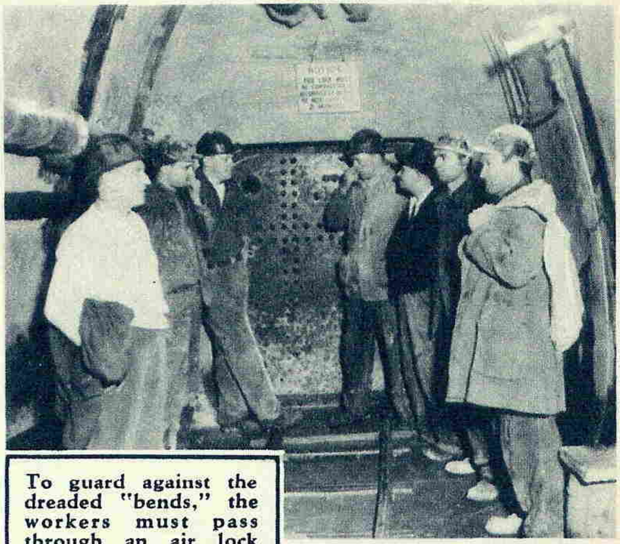
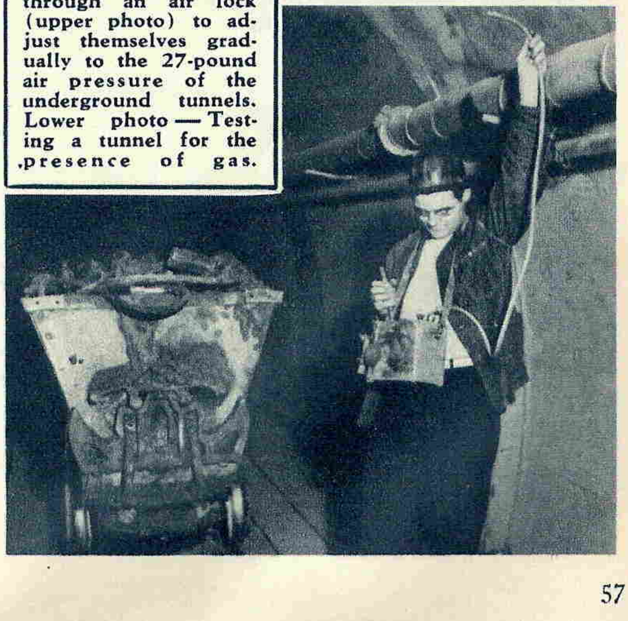
One of many trained rescue squad workers on duty at the Chicago project is shown above.

Construction of aeration and settling tanks at site of world's largest sanitary engineering project in Chicago, Ill., is shown above. Over 72 miles of underground tunnels lead to tanks.

THE largest sanitary engineering project in history, involving $135,284,000 in construction costs, is being undertaken by the sanitary engineers of Chicago, Ill., through co-operation of the Public Works Administration. To date, more than 42 million man-hours of employment have been created at the construction site, and in factories, mines, and forests providing the raw materials used. More than 4,000 men are employed.

Consisting of a series of underground tunnels, aeration, and settling tanks, the completed project will eliminate the flow of sewage into Chicago's waterways thereby making it unnecessary for the metropolis to divert water from the Great Lakes to flush its wastes. In recognition of the interests of all states bordering the Great Lakes, since it controls lake levels, the U. S. Supreme Court has ordered the project completed by December 31, 1938.

Every precaution is being taken to insure the safety of workmen as they burrow through solid rock, clay, loose dirt, quicksand, gas and water. Safety crews make periodical tests of the gas content of the tunnels and highly trained rescuers are ready to swarm to any area where misfortune has occurred.



To guard against the dreaded "bends," the workers must pass through an air lock (upper photo) to adjust themselves gradually to the 27-pound air pressure of the underground tunnels. Lower photo — Testing a tunnel for the presence of gas.

CREATING The

TECHNIQUE OF ADVERTISING LAYOUT

STATE
PALACE
MAYFAIR
SUNKIST
VAUDEVILLE

Left—Douglas Leigh, who went to New York from Alabama and took Broadway's breath with his spectacular signs. Above—The largest sign of its kind in the world extends a block along the Great White Way, soars ten stories into the sky. The bright fish slowly swim in a blue-green sea.

by Donald G. Cooley

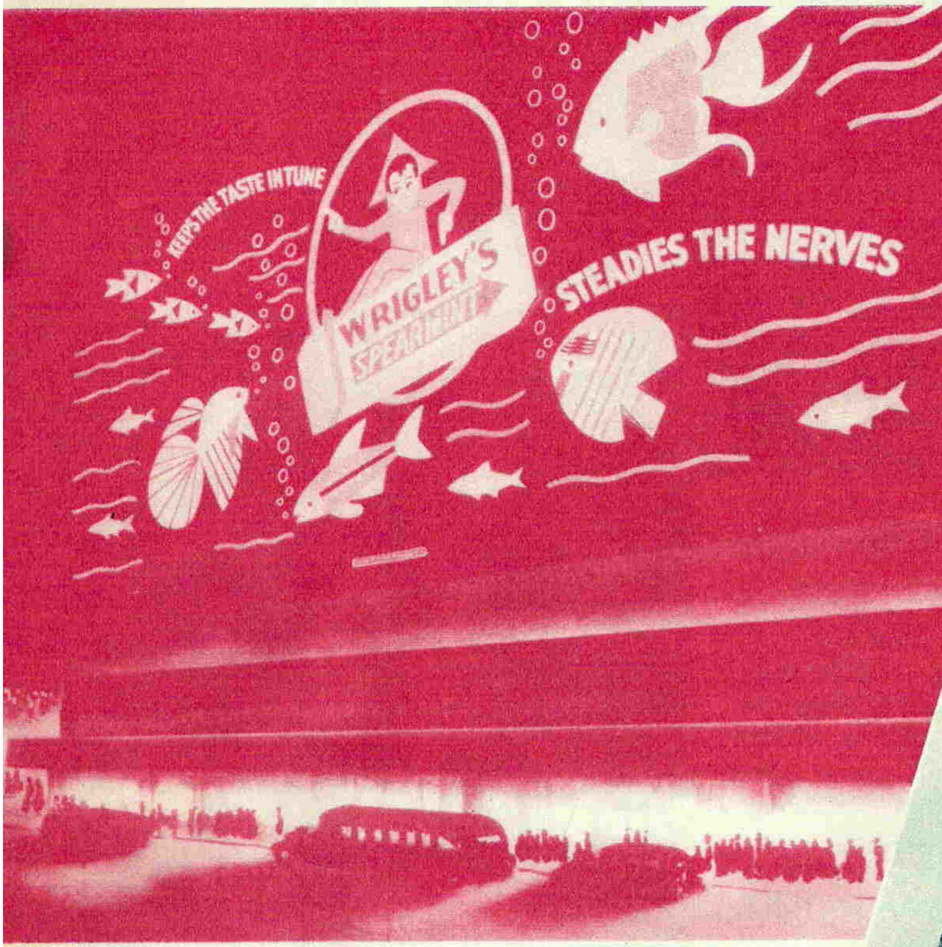
SOME day New Yorkers are likely to be startled by the discovery that the dome of the Empire State Building has turned into a gigantic cigarette glowing more than 1,000 feet in the air.

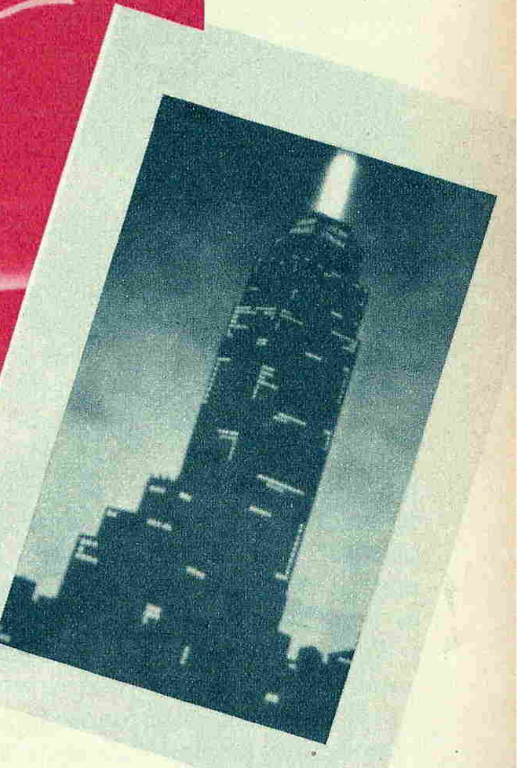
Not an actual cigarette, of course, but an advertising colossus made up of a million white electric bulbs, a few thousand red ones to paint a burning tip against the night sky, and the name of the manufacturer blazoned in neon on all four sides of the world's tallest building.

It will be what the trade calls a "spectacular"—an electric advertising sign which is everything the name implies. When and if it becomes an actuality, it will be the achievement of Douglas Leigh, a young man only twenty-seven years old, who already has to his credit a dozen of New York's costliest signs. A sketch of his daring Empire State idea adorns the wall of his office, and in his desk are figures proving that the job can be done for $30,000.

This sum is by no means unusual as costs go in this unique industry. One of Mr. Leigh's spectaculars brings in a monthly rental of $2,400. In New York alone the investment in spectaculars runs into millions

SPECTACULARS



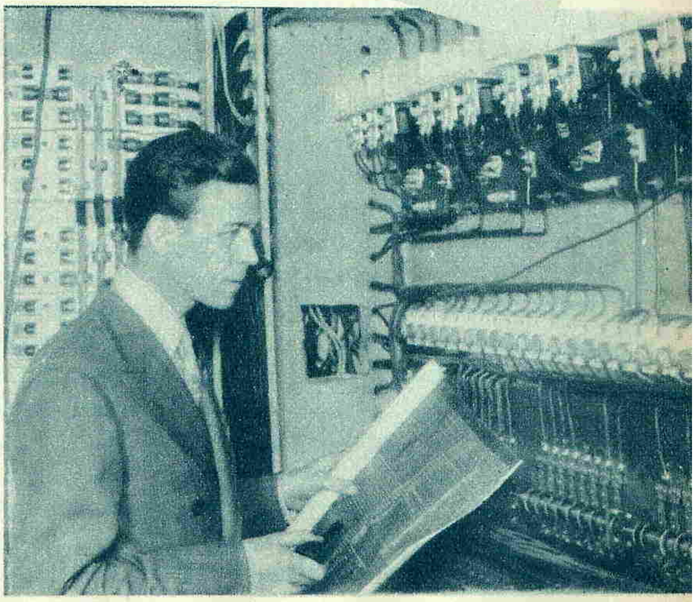


Right—The useless "mooring mast" of the Empire State Building as Leigh visions it—a huge cigarette glowing one thousand feet above the sidewalks of New York.

annually, and every city in the country makes generous contribution to a husky young giant of an industry which is as modern as today's newspaper. Time was when an electric sign was regarded as breath-taking if it presented a few hundred bulbs which flashed on and off periodically, spelling out some trade name. Today the spectacular sign has borrowed a realistic technique from the motion picture, and the invention of the neon light has revolutionized an industry which is just coming into full maturity.

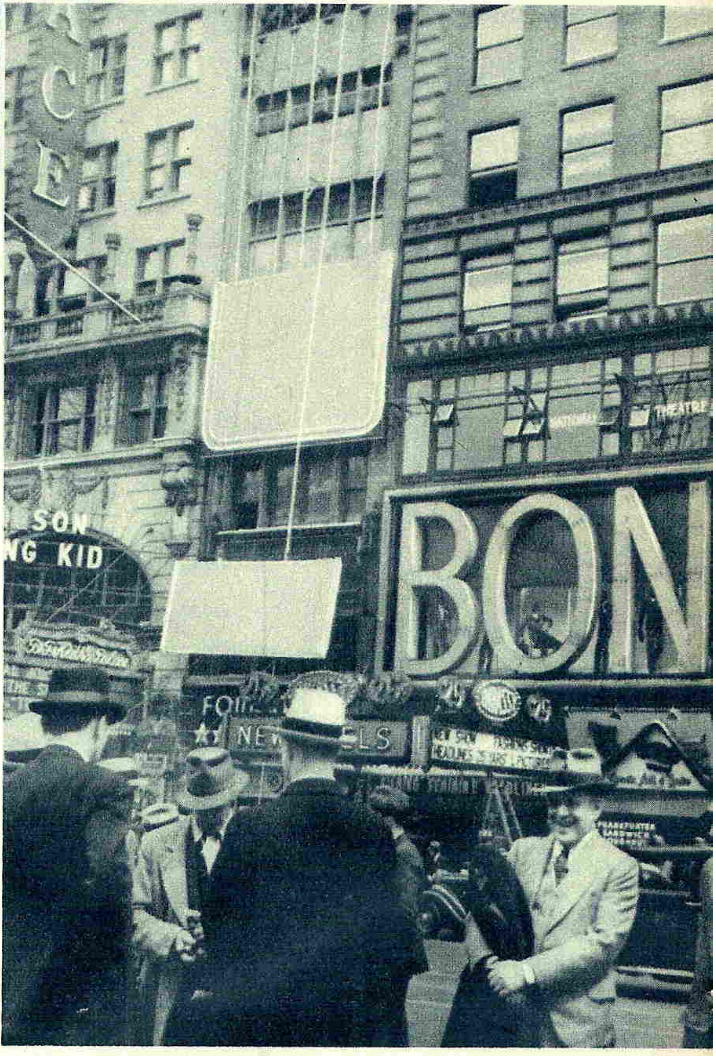
It is a strange and exciting business, that of erecting Broadway's "spectaculars." It is an art calling for the talents of the steelworker, the electrician, the artist, the mechanic and the financier. Miracles are wrought in neon tubing and electric bulbs. Light has become a medium for painting pictures which move, and tell a story.

Amazingly realistic bits of action are drawn by flashing lights which flow with the ripple



Part of mechanism which enables a sign to paint moving pictures with light. Cams at lower right revolve, contacting current at split-second intervals.

Left—Towering steel framework of a sign. Not more than 35 per cent of frame can be covered because strong winds might tear the sign from its rooftop foundation.



Below — All spectaculars are not on roofs. Here a painted sign is being built upon a metal background that completely covers the face of a Broadway theatre building.

of water, or leap and dart with the dash of sword-thrusts.

The mechanism which gives the breath of life to a spectacular sign is a complex mechanical miracle. In one of Mr. Leigh's huge signs the penguin trademark of a cigarette manufacturer winks its eye off and on 100,000 times a day. Each single bulb in a sign, though it may be but one of 50,000, must flash off and on with split-second accuracy, contributing its brief spot of color to a sign which may be five or six stories high and half a block in length.

The biggest spectacular sign in the world, which Mr. Leigh regrets is not his, occupies an entire block on Broadway between Forty-fourth and Forty-fifth Streets, on the east side of Times Square. Soaring ten stories above the street, it represents multi-colored tropical fish slowly swimming in a sea-green sea. Higher than the Statue of Liberty, the green sign uses sufficient electricity each night to serve a city of 10,000. Seven and a half tons of electrical equipment are housed in a control room under the sign. The wiring alone totals 70 miles, sufficient to run two lines between Washington and Baltimore, and the neon tubing extends 1,084 feet. Total weight of the sign is 110 tons. The building on which the sign rests was especially built to bear the tremendous weight. The cost of the sign alone was $1,000,000.

How does a "spectacular" come into being? It begins with an idea, like the sketch of the Empire State cigarette already mentioned.

"The animation of a sign should tie up intimately with the product advertised," Mr. Leigh said. "That is, it shouldn't be motion for the sake of motion, but should tell a story relating to the product."

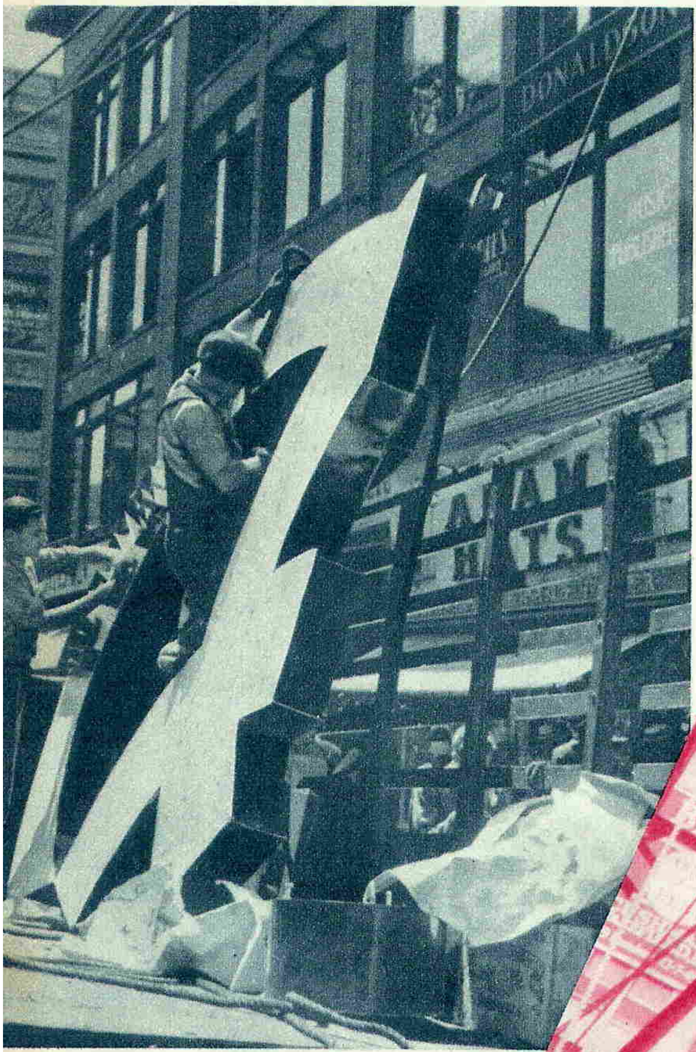
His theories have proved themselves in actual practice. The success story of Douglas Leigh is the heartening tale of a young man who went out and created a job for himself. Not long ago he was working for a New York sign company, resigning when the depression cut his salary to $30 a week. Today, at 26, he heads his own organization, Douglas Leigh, Inc., which has erected more than half a million dollars worth of signs in the Times Square district alone. He is an amazingly young, pleasant-spoken, mild-mannered man whose daring imagination has stamped its imprint on Father Knickerbocker's theatrical district.

It is quite probable that a stream of real smoke will drift away realistically from the tip of that Empire State cigarette. It is a touch which can reasonably be expected of Mr. Leigh's ingenuity. A similar bit of realism can be seen in the coffee sign he has erected on Broadway. In it a gigantic cup of coffee gives forth a cloud of appetitzing steam! The steam is furnished by the New York Steam Corporation, and 50,000 pounds a month is used at a cost of $60. When first erected, the steam condensed and rained on Broadway pedestrians, but improved pipe insulation soon corrected that.

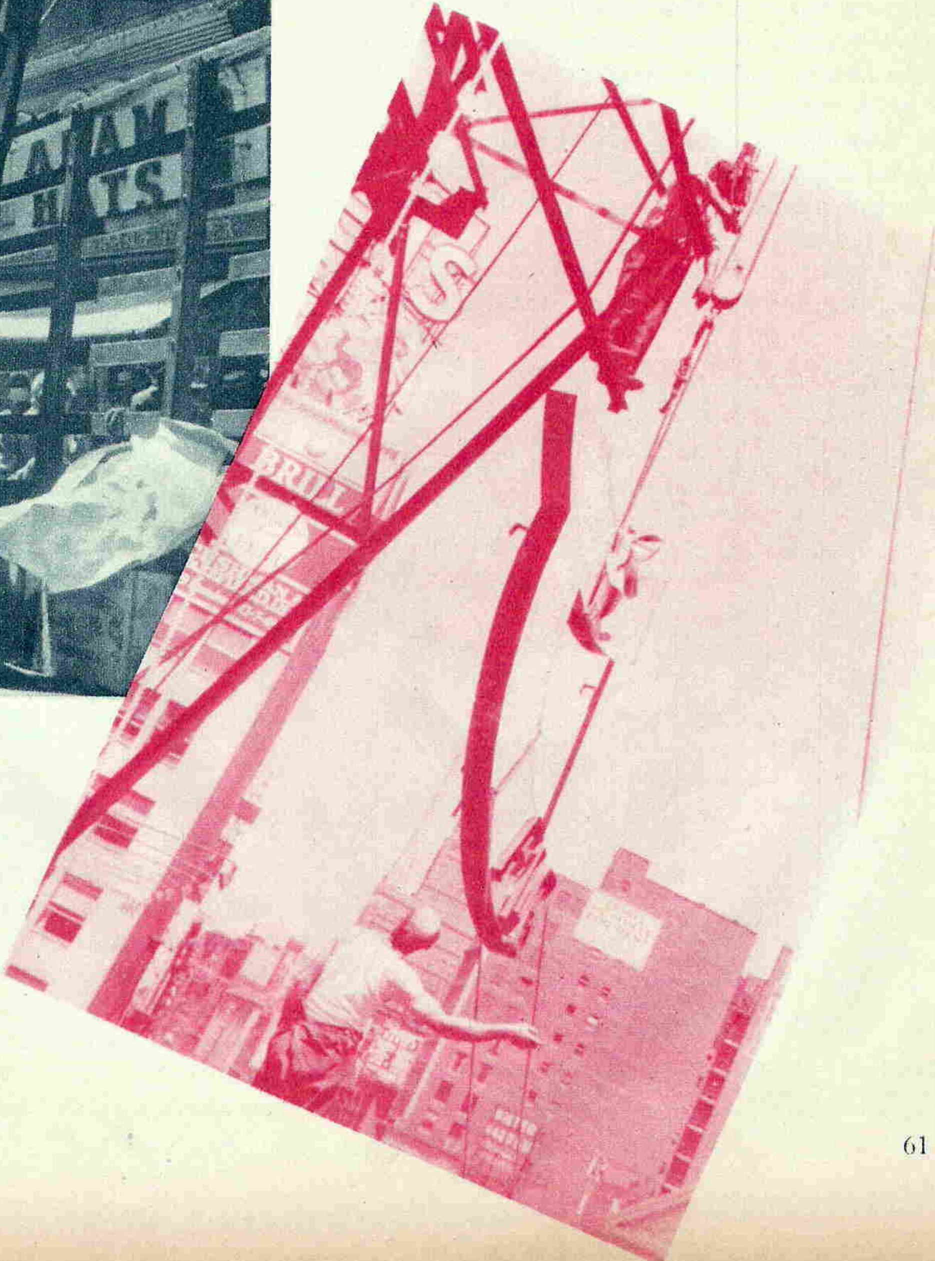
Mr. Leigh's newest sign, recently erected for a beverage manufacturer, illustrates the new trend in spectaculars. The manufacturer's trade mark is three interlocking circles. The problem was to devise some natural bit of action to fix the trade mark on the mind of the spectator. Douglas Leigh accomplished it by setting a neon clown to pitching quoits. The quoits are hurled over the face of the sign, dip down and loop neatly over a stake in the lower corner. The three quoits thus form the interlocking circles.

"A spectacular is good for three years," Mr. Leigh said. "The sign is leased for that period and rented on a monthly basis. A sort of installment plan purchase. It's not difficult

[*Continued on page* 142]

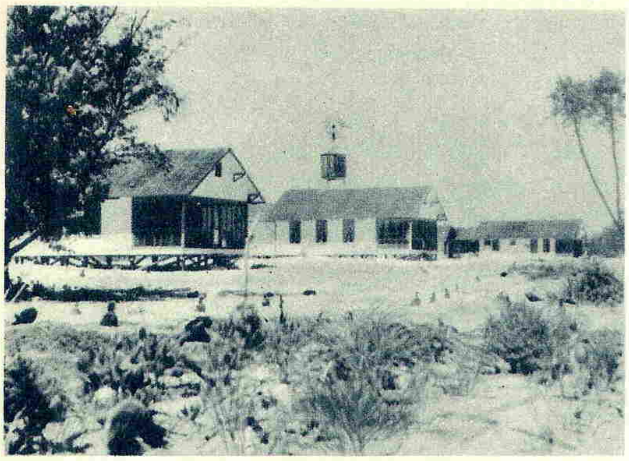


Above—Section of sign transported from the workshop, ready to be hoisted into position. A small fraction of a sign often fills a big truck.



Right—Section of a spectacular being gentled into its place. The average life of the big, flashing sign is three years; then people begin to tire of it.

Glue Replaces Nails In Wake Island Buildings



Substituting glue for nails, more than 3,000 tons of prefabricated buildings were made in Seattle and shipped to Pacific islands for use by Pan American's mid-Pacific air base crew.

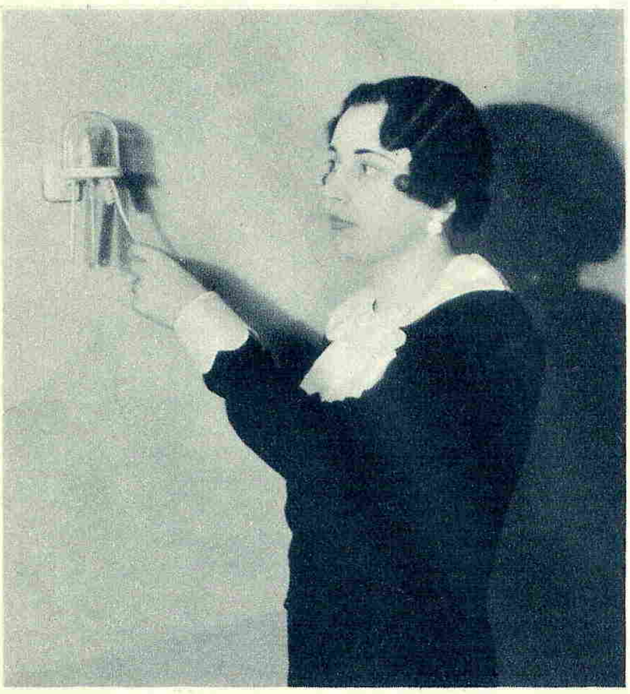
WITH almost no nails used, the entire village for Pan American mid-Pacific air base employees at Midway Island, has been fabricated by use of glue.

In the erection of walls, roof and floor, glue replaces nails almost entirely. Fir plywood panels are glued to studs, plates and sills throughout the house.

Holder Protects Toothbrush

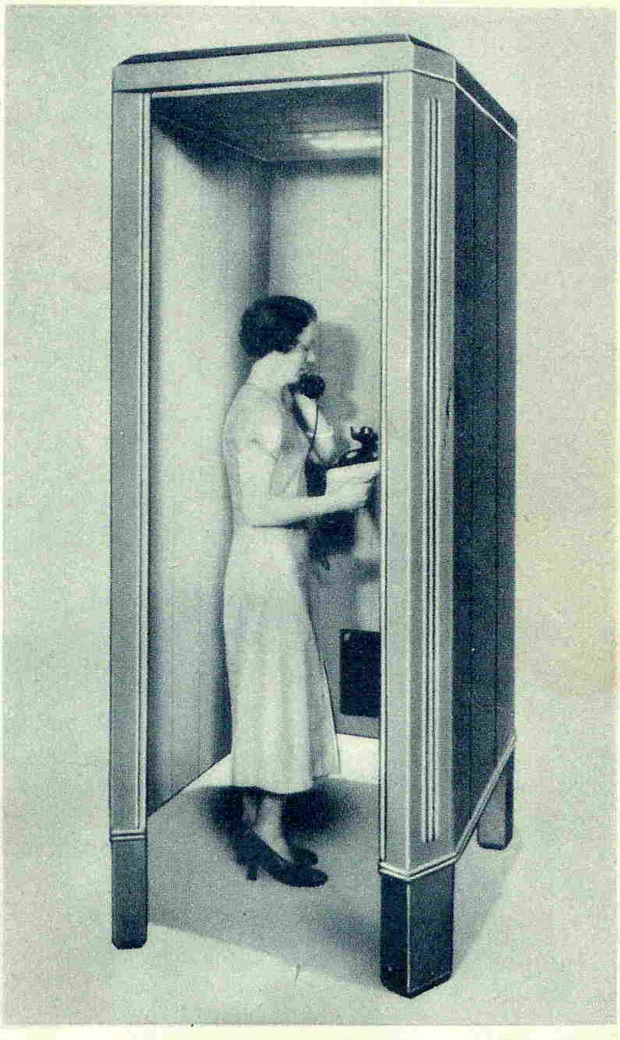
HOUSING four toothbrushes, this sanitary holder carefully guards the brushes during the time they are idle each day. The brushes are inserted through a flexible slot in the rubber bottom which closes tightly about the handle.

Each brush has its own dustless, ventilated compartment where it becomes dry. While in the guard, the brush is constantly being treated with a pleasant antiseptic aroma that kills germs. The glass dome is removable for cleaning purposes and for antiseptic renewal.



A sanitary toothbrush holder which protects the brush during its many idle hours each day, also kills germs, by use of antiseptic material kept under small crystal glass protective dome.

Phone Booth Needs No Door



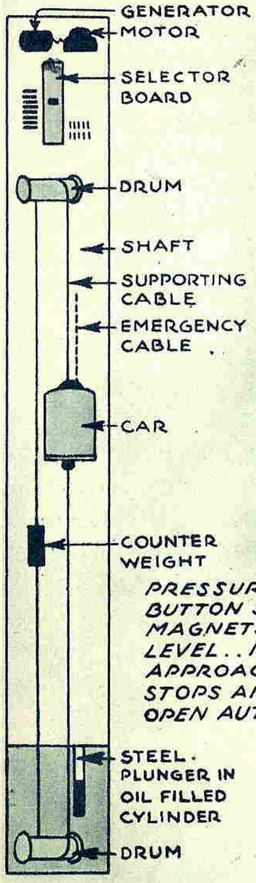
Open around base, and because of absorbent qualities of the lining, no door is required to achieve even greater privacy than that of more conventional closed telephone booths now in use.

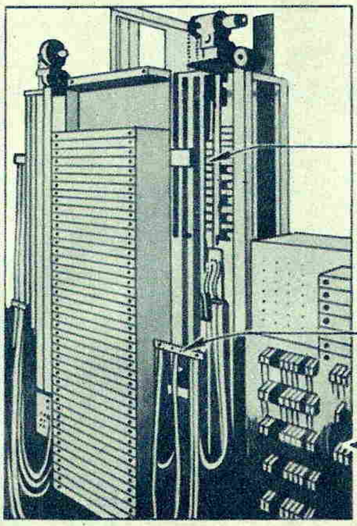
A DE LUXE telephone booth, utilizing a sound absorbent material instead of glass or wood panels, is the latest development of the Burgess Battery Company, of Chicago, Ill.

Open around the base, and because of the remarkable absorption qualities of the lining, no door is required. This feature of the design facilitates natural ventilation and easy cleaning, yet greater privacy is achieved than in the ordinary closed booth.

Robots Level "Radio City" Elevators

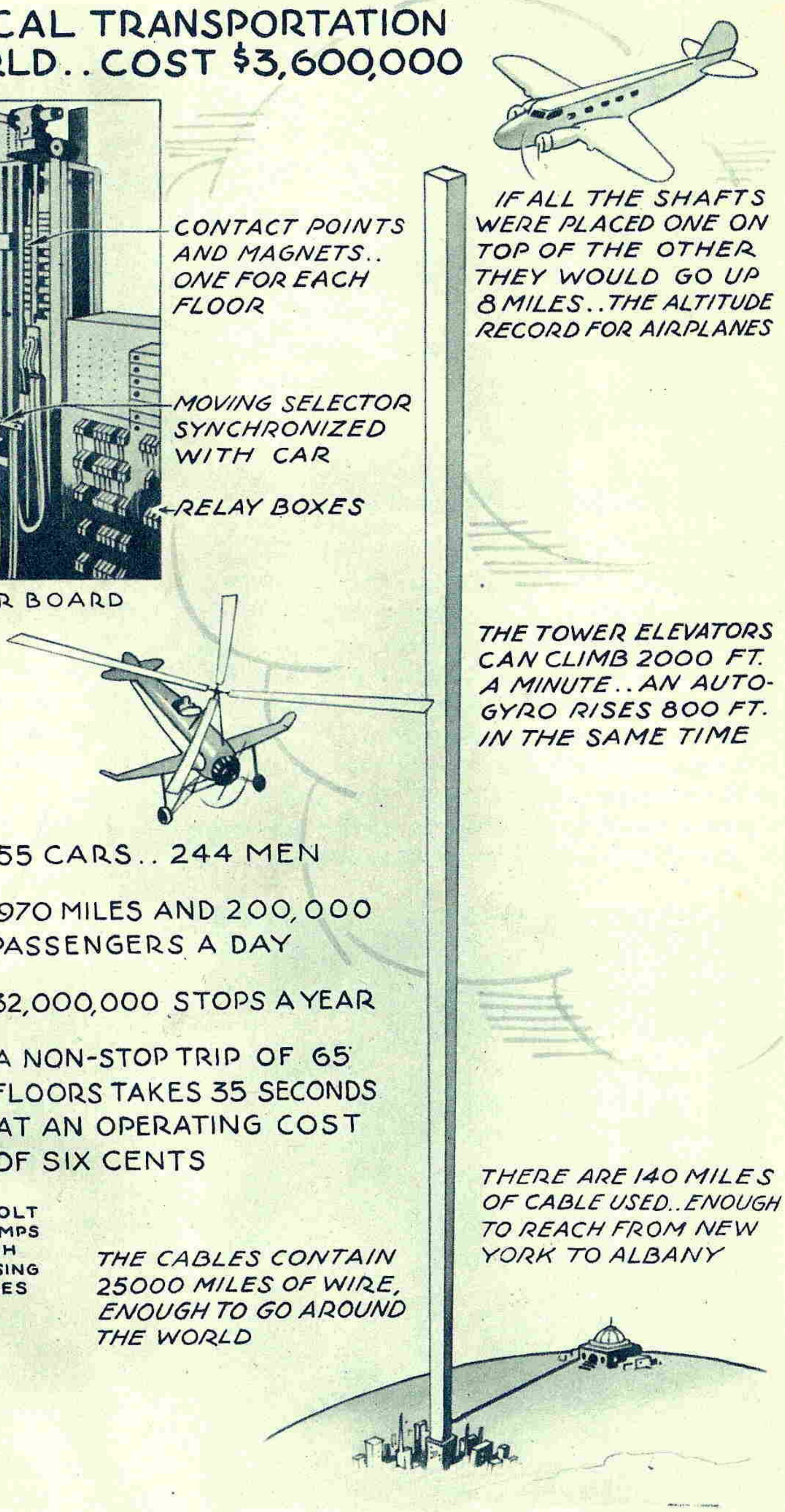
THE LARGEST VERTICAL TRANSPORTATION SYSTEM IN THE WORLD.. COST $3,600,000


GENERATOR
MOTOR
SELECTOR BOARD
DRUM
SHAFT
SUPPORTING CABLE
EMERGENCY CABLE
CAR
COUNTER WEIGHT
STEEL PLUNGER IN OIL FILLED CYLINDER
DRUM


CONTACT POINTS AND MAGNETS.. ONE FOR EACH FLOOR
MOVING SELECTOR SYNCHRONIZED WITH CAR
RELAY BOXES

SELECTOR BOARD

PRESSURE OF SIGNAL BUTTON SETS ALL MAGNETS ON FLOOR LEVEL.. NEAREST APPROACHING CAR STOPS AND DOORS OPEN AUTOMATICALLY



IF ALL THE SHAFTS WERE PLACED ONE ON TOP OF THE OTHER THEY WOULD GO UP 8 MILES.. THE ALTITUDE RECORD FOR AIRPLANES

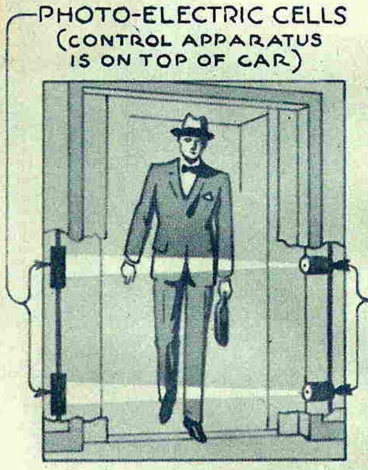
THE TOWER ELEVATORS CAN CLIMB 2000 FT. A MINUTE.. AN AUTOGYRO RISES 800 FT. IN THE SAME TIME

- 155 CARS.. 244 MEN
- 1970 MILES AND 200,000 PASSENGERS A DAY
- 32,000,000 STOPS A YEAR
- A NON-STOP TRIP OF 65 FLOORS TAKES 35 SECONDS AT AN OPERATING COST OF SIX CENTS

THERE ARE 140 MILES OF CABLE USED.. ENOUGH TO REACH FROM NEW YORK TO ALBANY

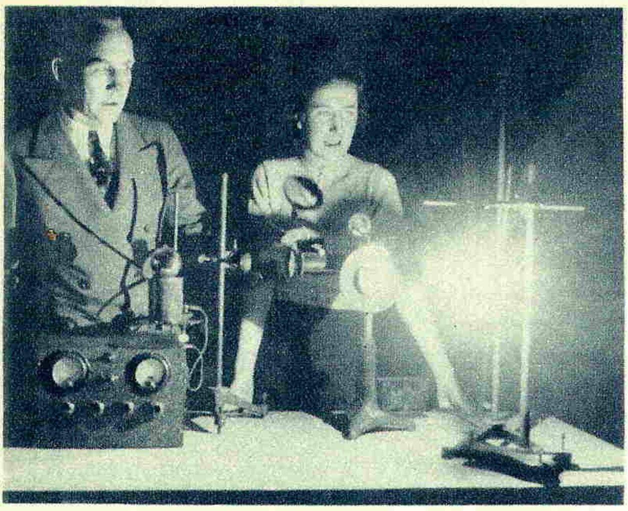
THE CABLES CONTAIN 25000 MILES OF WIRE, ENOUGH TO GO AROUND THE WORLD

PHOTO-ELECTRIC CELLS (CONTROL APPARATUS IS ON TOP OF CAR)


110 VOLT AC LAMPS WITH FOCUSING LENSES

EVERY DOOR HAS TWO "ELECTRIC EYES".. IF BEAMS OF LIGHT ARE INTERCEPTED THE DOOR CANNOT CLOSE

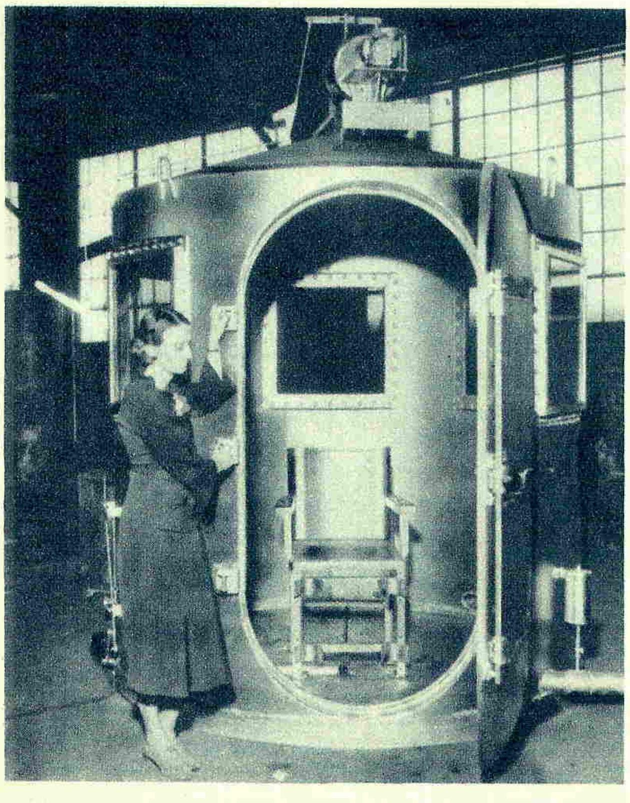
Every two weeks the elevators in Rockefeller Center, N. Y. City, journey up and down a total of 25,000 miles, the equivalent of the globe's circumference at the equator. Last year this amounted to 720,000 miles of vertical travel, in which 30,000,000 passengers participated. To insure smooth operation, selectors at the top of each shaft are synchronized with the car below. As the car passes a floor level, the selector passes over a magnet and contact point in the control box. Thus when the button on the 50th floor is pressed, the corresponding magnet is energized. The selector, coming in contact with energized magnet, smoothly stops the car at the correct floor. A self-leveling device functions and the door opens automatically. Electric eyes prevent the door closing while any obstruction is in the doorway, and as the circuit is not complete until the door is closed, there can be no accidents from sudden starts. Any failure of current automatically applies fool-proof safety brakes.



Prof. Walter S. Huxford, of Northwestern University, and Marian Ferrell testing meter that registers ultra-violet rays of sun lamps. Device also can test ultra-violet sun rays.

Gas Replaces The Noose

FOLLOWING the lead set by Nevada, Arizona and Colorado in the quick and painless method of executing criminals by gas, Wyoming has installed a lethal gas chamber to replace the noose, a now fast disappearing method of capital punishment. The Wyoming death chamber, manufactured by a Denver, Colorado, firm, is claimed to be the most humane yet devised. Several other states are said to be considering the adoption of gas chambers for legal executions.



New lethal gas chamber which replaces the noose in Wyoming. The girl studying the apparatus is Helen Williams of Denver, Colo., where chamber was made for Wyoming authorities.

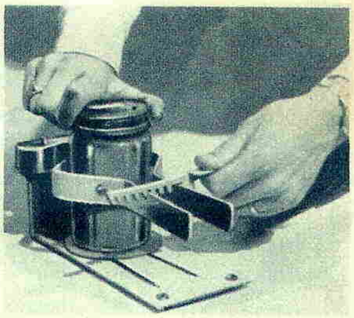
Ultra-Violet Rays Tested With Meter

SUN lovers who like to soak up vitamins from the sun in summer and bathe in the glow of a sun lamp on a winter evening can now learn just how many ultra-violet rays they are absorbing into their systems. A meter invented by Professors Walter S. Huxford and Walter Cashman of Northwestern University in Evanston, Illinois, to test the potency of the beneficial ultra-violet rays of lamps and other therapeutic units used in hospitals and clinics, can also be used outdoors to test the sunshine.

By means of the meter claims can now be definitely settled between snow resort and beachland boosters as to the efficacy of the sun in their different climates during the winter, when thousands go to the mountains to ski or to the southland to swim for health and sport. Meter test will eliminate danger of persons unknowingly exposing themselves to rays of mechanical devices producing ultra-violet rays of too great intensity thereby saving themselves from painful and sometimes more serious effects.

Jars Opened By Device

A NEW device has been introduced to prevent cutting the fingers or breaking the glass while removing tightly secured lids from jars. The jar is held solidly in place between two metal arms fitted with rubber suction discs. Suction discs also are fitted to the base of the device so that it will not slip on the table. A notched lever fits over the ends of the arms when the jar is in place and holds the arms in the most effective operating position. Jars of a great variety of sizes may be accommodated by the device. As the suction discs grip the jar firmly, the hands are free to remove the cap with a minimum of effort. Because of the compactness of the device, it is particularly suited for home use as well as for use in restaurants, commissaries, and stores handling bottled goods.



This device securely holds jars of any size while covers are removed without danger of breakage or cuts.

DeMille Uses Electric Secretary For Conferences

A PORTABLE electric secretary has been invented by Robert Sherwood, radio announcer, for Cecil B. DeMille. Used by DeMille for his story conferences, the device is so sensitive that all sounds in the conference room is picked up and recorded on disc records of either the aluminum or acetate type.

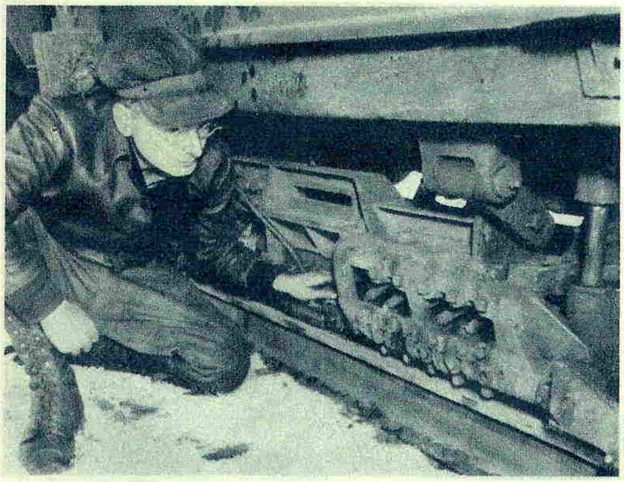
The secretary is capable of playing the recording over as many as four extra loudspeakers with enough volume to fill an average size theater.

The complete device weighs 75 pounds and consists of an all-wave radio, phonograph turntable, pickup, loudspeaker and microphone.

DeMille finds the equipment useful and valuable for his story conferences inasmuch as the entire mood of the conference is preserved better than could be done by shorthand.

Cecil B. DeMille (left) is shown with his new electric secretary used for recording everything said at his story conferences. Robert Sherwood, inventor of the device, is shown at the right.

Device Detects Track Flaws



Traveling stethoscope attached to the special railroad car locates and marks on tape, defects or flaws in the track. Photo shows N. J. Dwyer examining the equipment which glides along the track.

HIDDEN flaws in railroad tracks are being revealed by a traveling stethoscope which locates the exact spot in the rail and the extent of damage.

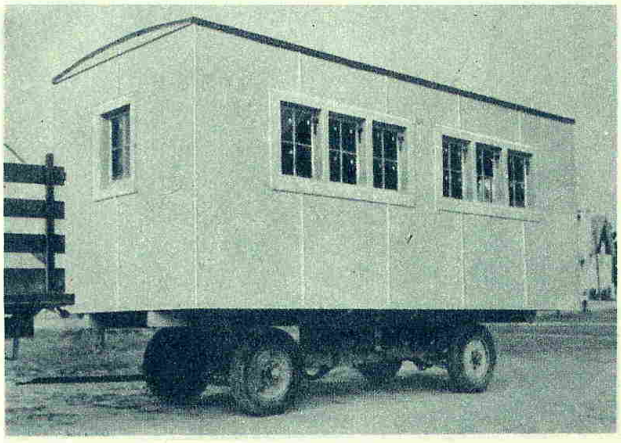
Locating these flaws which eventually would be subject to breakage, the detector car X-rays the track as it proceeds on its way and marks on a tape in the car, the exact point of weakening. The defective rail then is torn up and replaced, thereby preventing train derailment.

The flaw detecting equipment is located under a special car.

School Travels To Pupils

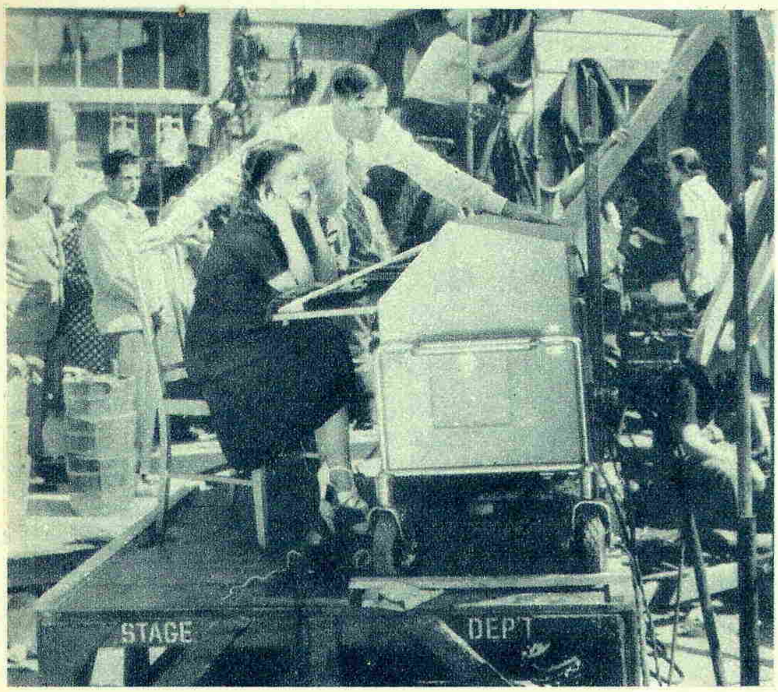
A TRAILER class room, attended by five pupils at present, was constructed that children may attend school when weather conditions prevent their traveling a great distance.

Used in Montana, the trailer is taken near the homes of a group of students whenever the snow becomes too deep for the children to attend their regular school. Here they may continue their studies without interruption.



Trailer school travels to the pupils when weather conditions prevent their leaving their homes for a long trip to school. Used in Montana, five pupils continue their studies in this portable building.

Recorder Gives Speedy Movie Sound "Play Back"



Helen Burgess, movie actress, hears her voice as it will sound on the screen. Harry Lindberg, "mixer" on the set, helps her tune in the "play back" from "tea wagon" recorder unit.

A NEW "tea wagon" used by motion picture directors, makes possible immediate "play back" of sounds and speech in a picture as it is photographed.

The unit contains the recording channel through which is photographed the sound "track" used in the theater, and a second phonographic recorder for making the disc record of the sound for "play back" purposes.

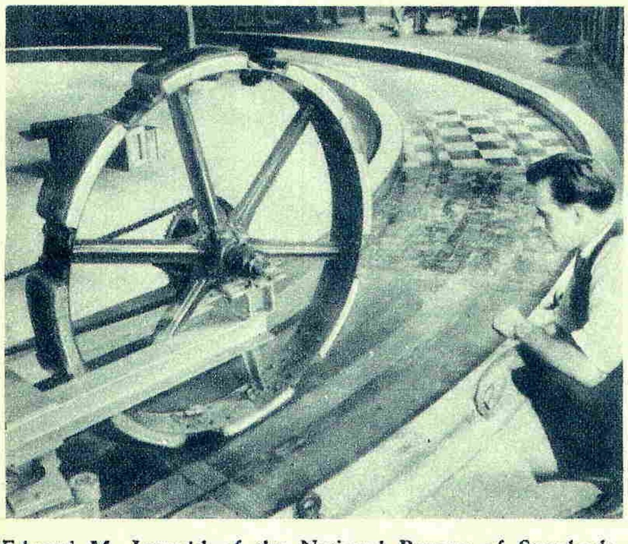
The phonographic recorder, with refinements and improvements in construction, uses the conventional record cutting system on an acetate disc, while the second part of the unit contains the "mixing" channel for making the sound on film record. The "mixing" channel is capable of controlling the sound levels according to the dramatic effects desired.

The cabinet housing the apparatus is made of duralium and weighs 300 pounds. With this equipment, the director may listen to words or sounds within a short time after they are recorded.

Device Tests Floor Material

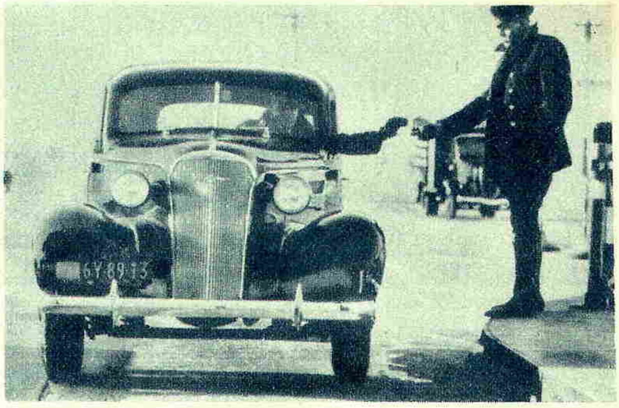
TO TEST the wearing qualities of various types of flooring material, the National Bureau of Standards has designed a machine which will effect the same wear as a man pushing a mail truck over it.

The equipment consists of a circular floor on which is placed the material to be tested, and a large wheel which in passing over the material causes a definite amount of wear.



Edward M. Imwold of the National Bureau of Standards, watches as machine tests wearing qualities of floor material. Wheel causing wear, passes over circular area on which is placed material to be tested.

Water Ends Bridge Shocks



A stream of water striking car discharges static electricity collected on cars, before coin is passed to toll collector, thereby eliminating shock to driver and countless shocks to attendant.

A SQUIRTING shock preventer which discharges static electricity, removes an annoyance to patrons of the new Triboro Bridge in New York City.

Static electricity accumulating on cars, many times discharged through the driver when he handed a coin to the toll collector, thereby causing an annoying shock.

Maierform Serves For New Tow Boat Hull Design

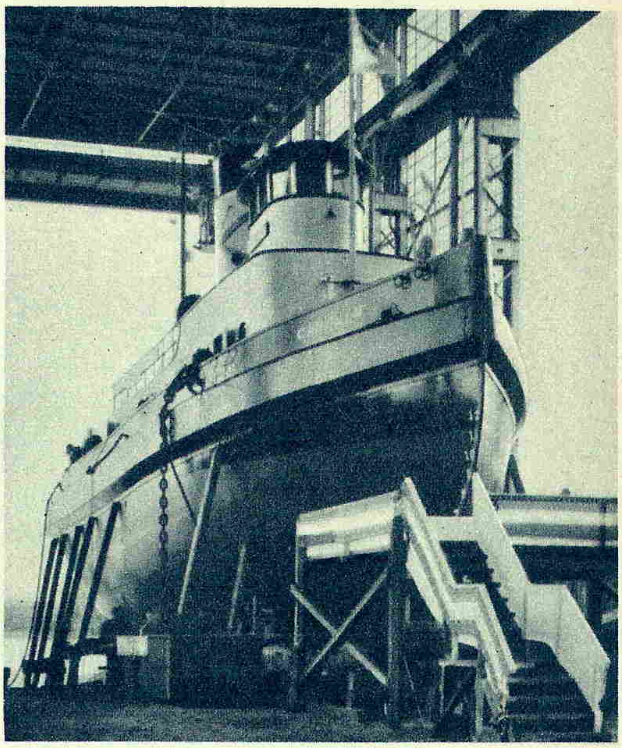
A NEW tow boat, the "Carolyn," the first of its kind to be launched in the United States, was designed on the "Maierform," a patented hull form which results in a more easily driven craft and one having greater seaworthiness.

Instead of the usual wooden guard rails fitted around the hull, a very heavy and deep guard built integral with the hull frames and shell plating is used and extends from stem to stern.

Ninety-five feet long overall, with a 24-foot beam, the craft is driven by a 600-horsepower Unaflow vertical type marine engine of two cylinders, each having a 25-inch diameter, and a 20-inch stroke, operating at 130 r.p.m. on 185 pounds steam pressure and 50 degrees superheat.

The craft was built at the Pusey and Jones Corporation yard, Wilmington, Del.

The bow is fitted with "war nose" type bumper, invented by Capt. H. C. Jefferson. The regular rope bow fender is fitted over the "war nose." The rudder is operated by a ram type steam steering engine.



Tow Boat "Carolyn," recently constructed for the Donaldson Towing and Lightering Company, of Philadelphia, is ninety-five feet long overall, and carries a crew of thirteen. A sister ship recently was launched.

Trailer Follows Motorcycle

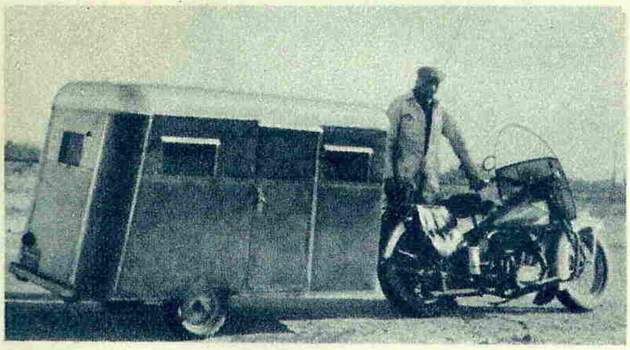


Photo shows Otto Gerling's solution to the problem of seeing America first, and yet with a minimum of expense. Attaching this seven-foot trailer to his motorcycle, he started on a tour already 4,000 miles long.

SEEING America first with a minimum of expense was the problem of Otto Gerling, of Ellensdale, N. D., so he decided on this house-trailer for his motorcycle.

The miniature home is seven feet long and 43 inches wide, and is equipped with a kerosene heater, radio, electric light and bed. The space under the bed serves as a storage room for his luggage and cooking utensils.

Gerling, who has covered about 4,000 miles since attaching it to his two-wheel vehicle, is shown following his arrival in Phoenix, Ariz., during his tour.

Mail Box Furnishes Stamps

A COMBINATION mail box and postage stamp seller is now being used by the Japanese post office. The new machine solves the problem of finding a post box after the stamp is attached to the letter, and what sometimes is an even greater problem, that of procuring a stamp when a mail box is available. It is claimed to be the first of its kind in the world. Similar devices will be installed in important sections of Tokyo.

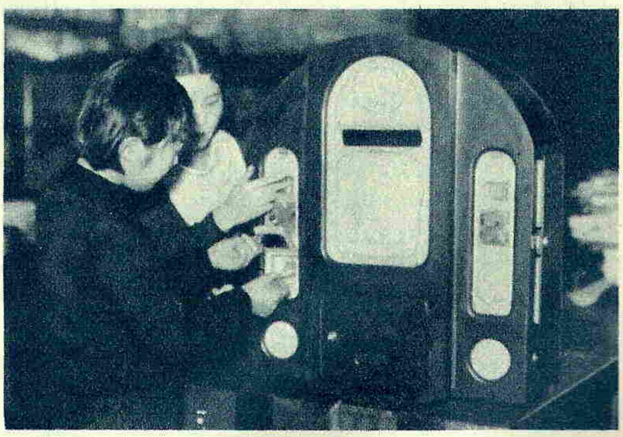
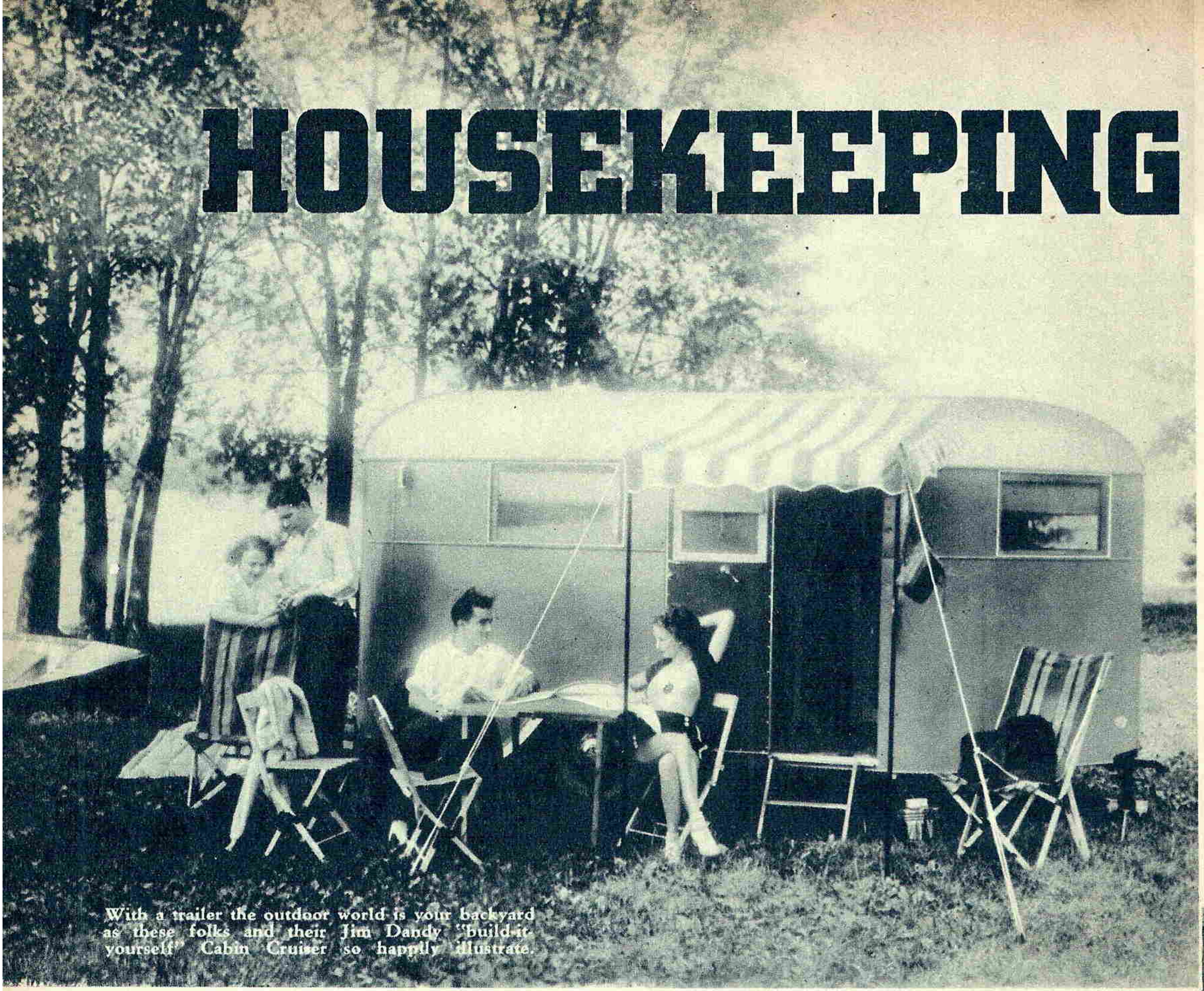


Photo shows girls using new combination mail box and stamp dispenser, recently placed in use in Tokyo. This machine is claimed in Japan as being the first of its kind in the world.

HOUSEKEEPING

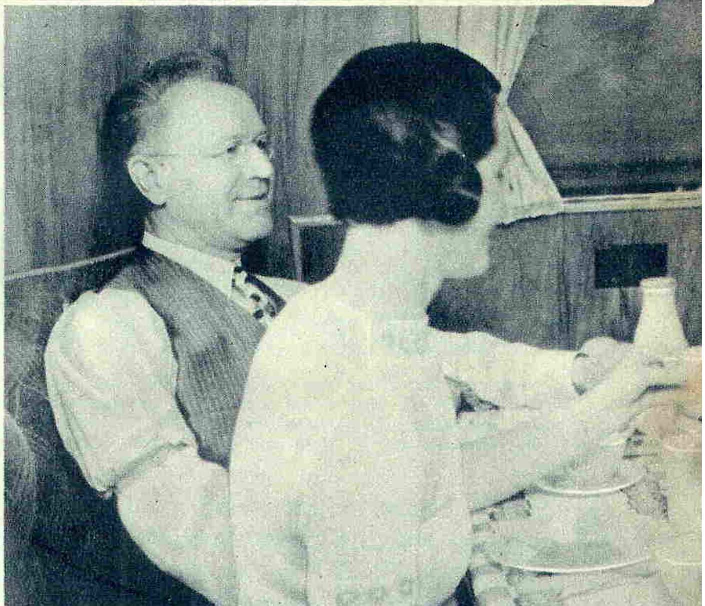


With a trailer the outdoor world is your backyard as these folks and their Jim Dandy "build-it yourself" Cabin Cruiser so happily illustrate.

Furnishing your home-on-wheels properly is the best way of insuring a care-free trip.

IN PLANNING a trailer trip, what you leave at home is apt to be fully as important as what you take with you. In other words, you will soon learn the value of traveling light. The personal wants and desires of those making the trip must, of course, be taken into consideration and the quantity of essential supplies, such as food, will depend upon the length of the trip, number of persons, availability of fruit and vegetables in season and the general location, whether mountains, seashore or only main traveled roads. The following check list cannot be all-inclusive but it may be found useful as a guide and serve to prevent overlooking some very essential articles.

Dishes.—Plates, cups, saucers, platters and servers, bowls, pitcher, glasses (large and small), knives, forks, spoons, salt and pepper shakers, paper plates, paper cups, sugar bowl and cream pitcher.



The value of traveling light is quickly impressed upon the trailer owner due to the limited space available. However, if proper housekeeping equipment is selected there is no reason why a trailer cannot be as comfortable as an apartment.

in a TRAILER

by Esther Hall

Kitchenware, etc.—Butcher knife, bread knife, paring knife, large fork, cake-turner, can opener, bottle opener, corkscrew, fish scaler, egg beater, gas toaster, electric toaster (110-volt for use in camps), ice pick, fly swatter, cook book, small broom, dust pan, floor mop, scrub brush, soap and chips, cleaning powder, steel wool, toothpicks, matches.

Pots and pans.—Coffee pot, tea pot, double boiler, frying pans, assorted stew pans of different sizes, pancake griddle, tea kettle, and (optional) fireless cooker, pressure cooker and ice cream freezer.

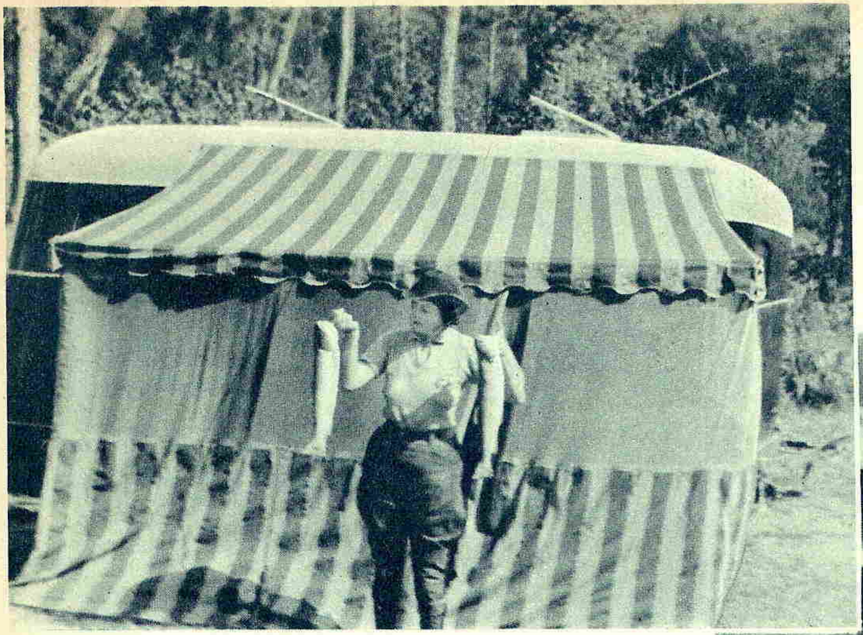
Food.—Coffee, tea, sugar, salt and pepper, bacon, butter, shortening, eggs, milk (canned), cheese, bread, crackers, flour, pancake flour, cereals, potatoes, syrup, jams and jellies, peanut butter, beans, rice, spaghetti, oranges, lemons, raisins, dried fruits, canned vegetables, canned soups, canned fruits, canned meat and fish, vanilla and other extracts, baking soda, baking powder, mustard, horseradish, tomato ketchup, water, ice.

A woman who practices what she preaches is Esther Hall (above), author of this article. From her vast practical knowledge of trailer housekeeping requisites, Miss Hall imparts advice that will save the beginner much grief, money, and time.

There is no need of "roughing it" when traveling in a modern trailer as the dining nook of a Pierce-Arrow Travelodge (above) shows. Comfortable upholstered seats accommodate four to six persons. Unbreakable dishes are used by many trailerites.

Bedding, linens, etc.—Sheets, pillow slips, blankets, towels (bath, hand and dish), wash cloths, dish cloths, table cloths (or oil cloth), napkins, paper napkins, paper towels.

Miscellaneous. — Water bucket, waste basket, garbage can, thermos jug, 5-gallon gasoline can, 1-gallon gasoline can, syphon, funnel, fire extinguisher, 100-foot extension electric cord with plug and socket, flashlight, gasoline lantern, electric fan, electric iron, ironing board, clothes line, cur-



A screened porch, such as this Covered Wagon trailer has, makes a grand sitting room by day and an open air bedroom by night. Available for use with many trailers, the porch constitutes one of the luxuries that make trailer life popular.

Many trailers have de luxe equipment. The interior of a Bender Travel Mansion (below) reveals a room-in-room combining a utility cabinet, wardrobe, and shower stall. Clothing can hang unwrinkled in the full length wardrobe while undergarments occupy roomy cabinet drawers.

tain partition (for privacy), fuel for heating stove, first-aid kit, toilet articles.

Miscellaneous (Personal).—Check books, travelers' checks, maps, calendar, ink, pen and pencils, paper, stamps, string, scissors, needles, thread, buttons, watch or clock, compass, thermometer, sun glasses, field glasses, golf clubs, tennis rackets, fishing tackle, camera, films, magazines, books, radio, playing cards or other games for rainy days.

The standard equipment furnished with most of the commercial trailers on the market includes (depending on price) beds for two, four or six persons, mattresses, gasoline cook stove (2 or 3-burner) a built-in sink, water tank (10 to 30-gallon), built-in cabinets and drawers, built-in wardrobes, ice-box (50 to 75-pound), toilet commode or chemical toilet, electric lights (for both 110 and 6-volts), radio antenna, heating stove, dining table, chairs (optional) and in some of the de-luxe models, a bath or shower.

Items which are optional but which add much to success of the trip are—window awnings, screened porch, folding cot, folding table and chairs (the comfortable deck chairs for lounging out doors), a night lamp, an electric hot water heater, and a wind charger.

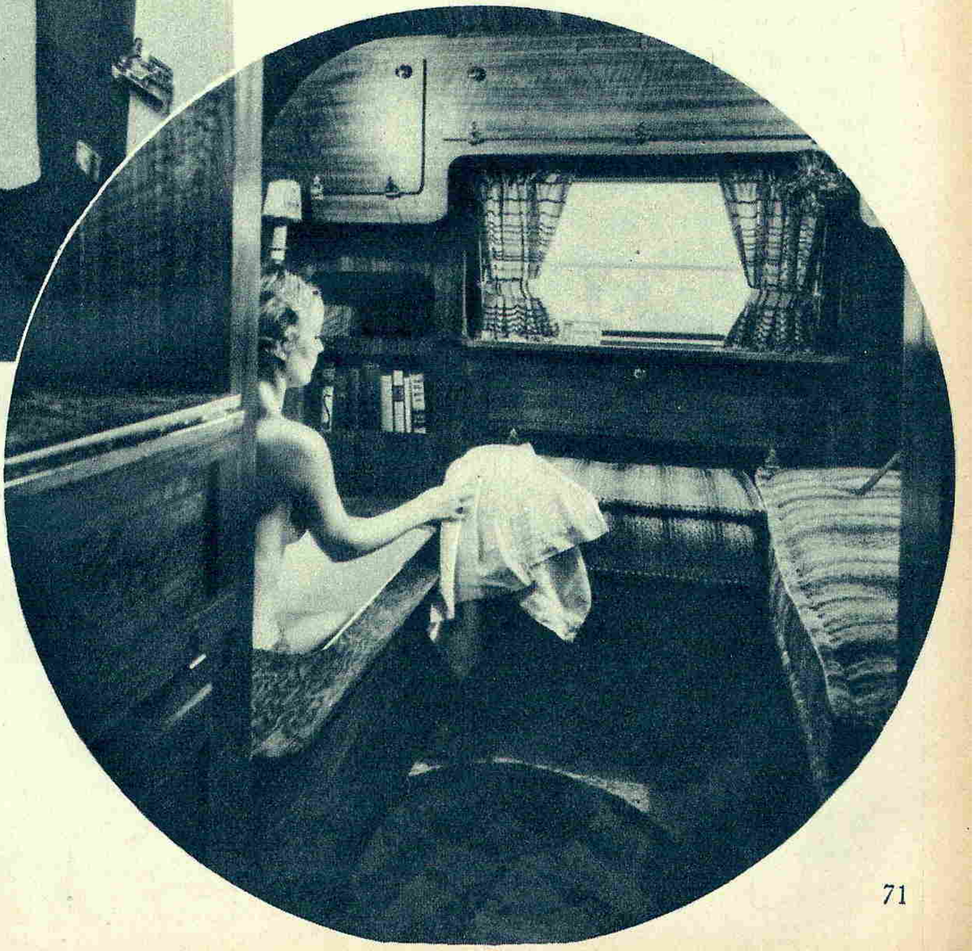
If we had to decide what trailer feature (not an actual necessity) we had to part with, the family, we feel sure, would unanimously vote for keeping the screened porch. It requires only a few minutes to attach it to the trailer and it makes an outdoor living room by day and an extra bedroom by night. The roof of the porch is a large gayly striped awning (about five feet wide by twelve feet long) which is hung from hooks on the trailer roof or fastened by straps which go across the trailer roof and are fastened to stakes in the ground. Attached to the awning on three sides is strong, khaki-colored netting. The fourth wall is the trailer itself including the door. On this fourth side a strip of dark green canvas fits snugly from the ground to the floor level of the trailer to keep out flies and other insects. The floor of the porch is also green canvas. When lounging chairs and a cot are installed here, this becomes unquestionably the coolest and most popular spot in the daytime and at night it makes a delightful open-air bedroom.

The average modern trailer kitchen utilizes many ingenious devices to provide maximum convenience with limited space. The cookstove may be concealed in what appears to be only an attractive buffet, as in the Hayes Motor Home below. When meal time arrives, a cover is lifted and the stove is instantly ready to prepare a snack or a complete dinner.

Window awnings, we believe, were largely responsible last summer for the comments of visitors to our trailer home—"How cool it is in here!", when the thermometer hovered in the nineties outside. When we were traveling we drew down the inside shades and lowered the awning to cover the windows. The result was double protection from the sun enroute and when we stopped we found that the accumulation of heat in the closed trailer was much less than on previous trips. When we lived for a week or more in one place the awnings were a continual joy because of the shade, coolness and privacy from passersby afforded. In addition, they provided a gay tone to the exterior of the trailer which was in itself a contribution to the holiday spirit of our expedition.

A night lamp may seem a small item to mention but, when you are far from home in unfamiliar surroundings, it is a great satisfaction to be able to investigate promptly strange or unusual noises in the night. We find great comfort in a little copper night lamp that operates on so little electricity as to be practically negligible in "juice" consumption.

If we wish to leave the trailer to spend an evening elsewhere, we light the little lamp before leaving and we are spared that awkward stumbling into a dark room and fumbling for a light switch on our return. If



Full capacity concealed tubs make trailer baths the equal of those available in apartments. The Auto Cruiser tub for trailers (circle) features porcelain enamel and when not in use is concealed and covered with cushions to form a lounge. More and more the influence of women is reflected in the ever increasing number of standard furnishings being incorporated in trailer construction. The feminine touch is evident in closet, cabinet, and kitchen design.

Many women trailer enthusiasts claim that the novelty of performing familiar tasks (circle) in a miniature home changes the work to play if entered upon in the right spirit. Compact comfort is achieved in a trailer living room-bed-room-kitchen.

Housekeeping is fun in a miniature home-on-wheels when it is equipped with all the conveniences of an up-to-date city apartment. Neatly arranged, the kitchen of the Roycraft trailer shown below provides ample storage space for even the most pretentious housekeeping equipment.

one member of the family wishes to retire earlier than the others, the night lamp, placed low at the opposite end of the trailer, spares him the glare of full-sized ceiling or side lights and yet does not require other members of the family to retire in darkness. It is such little contrivances as this, we find, that make for that consideration of the other fellow so essential to harmony in trailer life.

Another modest little device, which is used every day and many times a day in our trailer housekeeping is an electric hot water heater, small enough to be tucked away in a few inches of space or hung by the cord over a hook. Father starts the day by heating his shaving water with it and from then on it meets the many needs for hot water with a final luxurious warm sponge bath made possible at bedtime without the necessity of starting a fire. All you do is to plunge the little gadget into cold water—from a teacup full to a tub full—plug in the other end of the cord to the light current and in less time than it takes to tell it there will be steam rising from the water. A few minutes more and the water will be actually boiling. The heat all goes where you want it to—into the water, not into the air to heat the room—and none of it is lost by having to be drawn through a long pipe. The fact that it sterilizes water makes it a most useful device in the event of sudden illness.

We have a little windmill device fastened to the front of our trailer which protrudes a few inches above the roof. As we drive along it catches the breeze and whirs industriously. As a result of this we are assured, when we stop along the road for our luncheon, of ample electric current in our own battery to operate two fans, a radio and electric lights (if we should want them). It affords a wonderful feeling of independence at night, too, to know that you have a supply of electricity of your own whether or not you are able to plug into an outside current on your overnight stop. This little convenience is called a "wind charger" and we heartily recommend it as a valuable accessory.

To the wife whose husband has become—or may be on the point of becoming—a trailer owner, may we say that there is no need to worry over the prospect of "roughing it" when you accompany your husband on

[*Continued on page* 120]

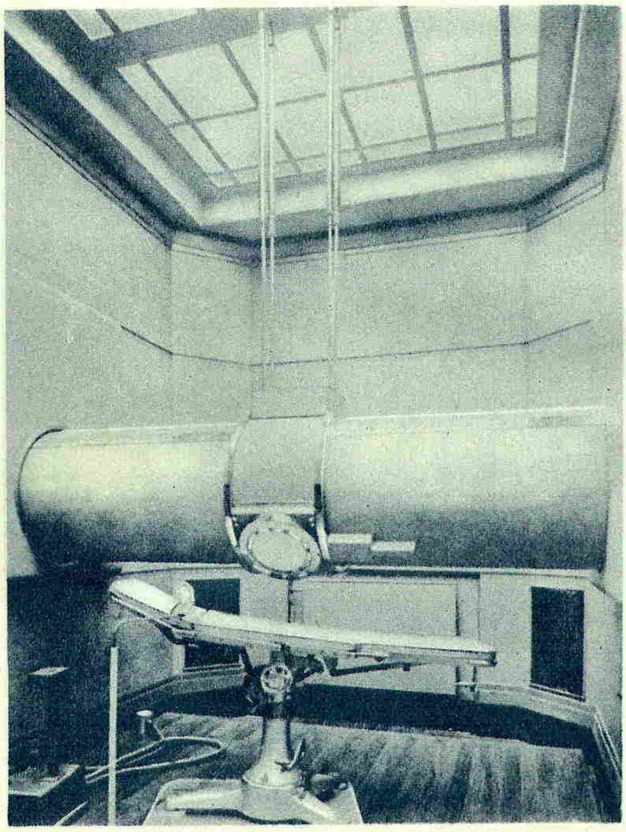
Road Surface Binder Created From Rayon Waste

USING waste lignin accumulated in the manufacture of rayon, a Pacific coast paper mill has developed a road binder for stabilizing surface soils on dirt highways. The lignin, which is the natural glue-like cement binding wood fibers together in a tree, is condensed, neutralized, and made waterproof without destroying its adhesive quality.

The binder is sprayed on the road from a truck and within a few hours after drying the road can be opened to traffic. Penetrating from one to four inches, the binder sets up a hard surface comparable to that of a macadamized road.

Bernard Winiecki, chemist, of Shelton, Wash. (left), and W. G. Drummond, paper manufacturer, examine a section of dirt road covered with their newly developed surfacing binder. The binder penetrates and hardens dirt for several inches.

X-ray Uses A Million Volts



The result of four years research by English experts, this powerful X-ray machine has been installed in a London hospital. Costing $150,000, the X-ray took one year to build.

SPECIALLY designed for the treatment of cancer a huge X-ray apparatus that operates on a current of one-million volts has been installed in St. Bartholomew's Hospital in London, England.

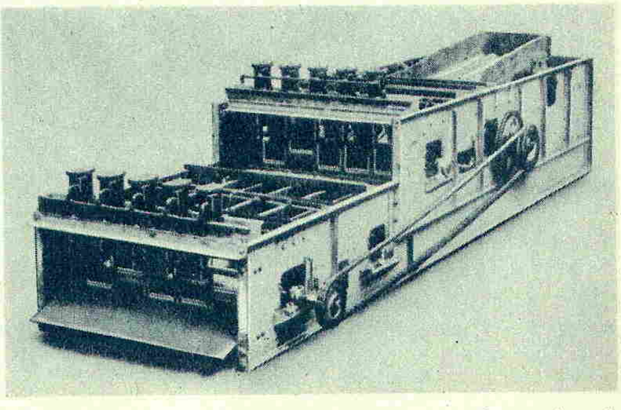
The apparatus weighs more than 10 tons and produces rays more powerful than those obtained from 10 grams of radium.

Machine Separates Coal

CLAIMED to be more accurate in operation than any visual method of coal picking, a new type of electric separator has been developed. The machine is designed to separate coal ranging in size from two to eight inches.

The electric picker owes its development to advances in the design of a thermionic valve which makes it possible to detect and amplify minute electric currents, thus permitting the conductivity of different materials to be turned to practical advantage.

Occupying less space than the usual type of picking machine, the electric picker reduces manual labor required to a minimum. Known as the Birtley Electric Picker, the machines are built by the Birtley Co., Ltd., of County Durham, England.



This electric picking machine separates coal ranging in size from two to eight inches, serving to eliminate the variation in results due to fatigue of manual laborers.

Beam Provides Safe Landing With Zero Visibility

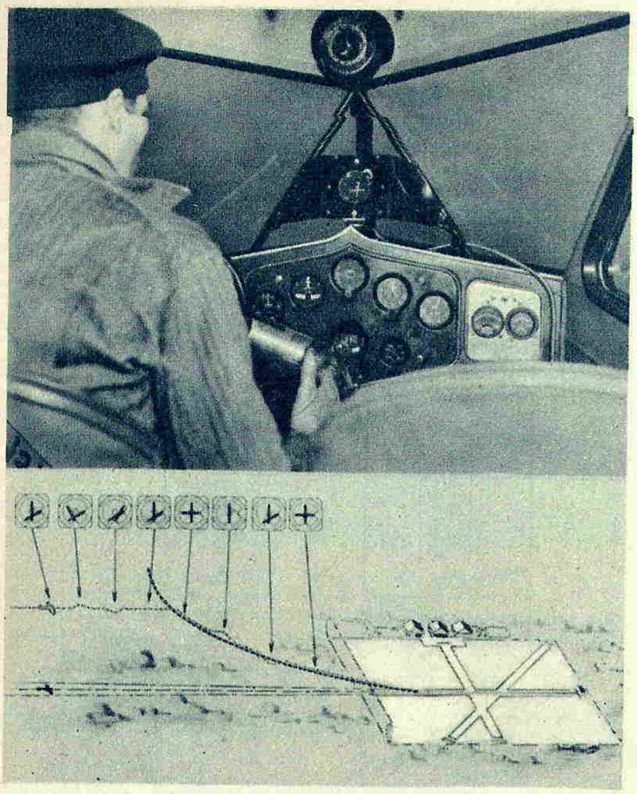


Photo shows device over instrument panel making possible a safe landing on field without the pilot seeing the ground. Vertical and horizontal reeds indicate the plane's position in relation to the ground signal.

REDUCING the present hazard of landing a plane on a field with no visibility, a radio controlled device now makes it possible to land planes safely by instruments alone without the pilot ever seeing the ground.

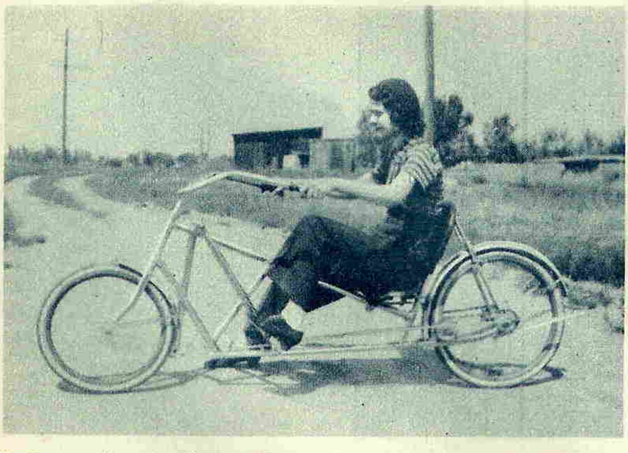
A portable transmitter at one end of the landing field sends out a beam signal which gradually bends upwards at the other end of the field. The plane approaching a landing picks up the signal on its receiver and with a registering device in front of the pilot, indicates whether the plane is on the signal track.

A vertical reed in the instrument before the pilot indicates the plane's position as right or left of the signal, and a horizontal reed indicates the position as under or over the signal. When the reeds are at right angles, the plane is riding the beam to a safe landing.

Low Bike Gives Added Power

WITH a seat only 19 inches from the ground making it unnecessary for the rider to leave the seat when stopping in traffic, a new type bicycle affords more safety and greater speed as well as being easier to ride.

The leg muscles are supplemented by the back muscles when going up hill. The rider sits in the same position as in an automobile, thus reducing discomfort.



Back muscles supplement leg muscles in uphill pulls on this low-seated bicycle, reducing the tired feeling after a long ride. It is not necessary for driver to leave seat when stopping.

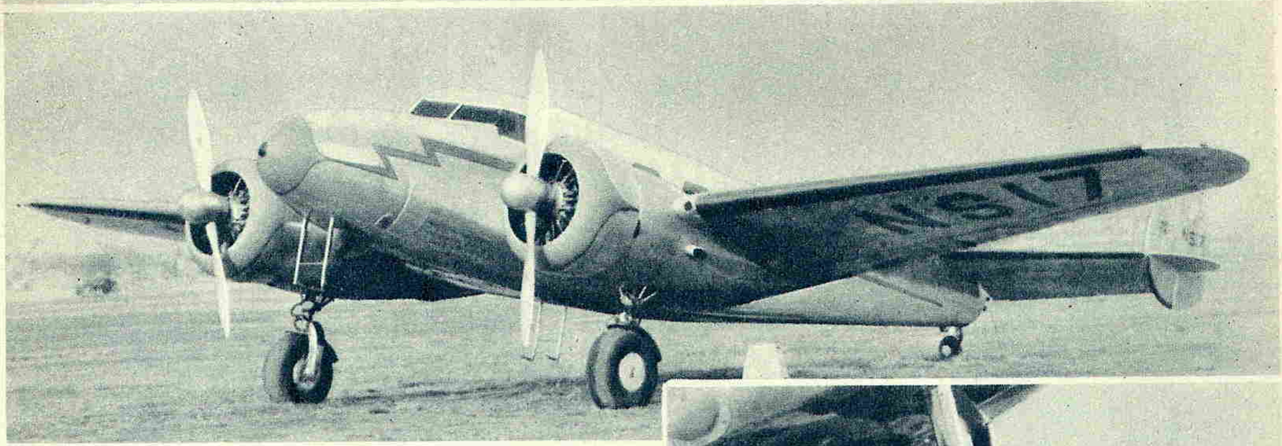
Greenhouse Goes Modern

Hail having caused $50,000 damage to an older greenhouse, St. Louis officials turned to skyscraper design for their new $120,000 greenhouse. Roof is of unbreakable composition.

WHAT is considered as the last word in green houses recently has been completed in St. Louis at a $120,000 cost. Unlike the average greenhouse of today, the roof is practically hail proof, the top being made of an unbreakable composition.

The glass panels are made up of 24 by 26-inch panes covering 15,000 square feet, and are fastened in place with copper glazing strips.

Air Liner Used As "Guinea Pig"



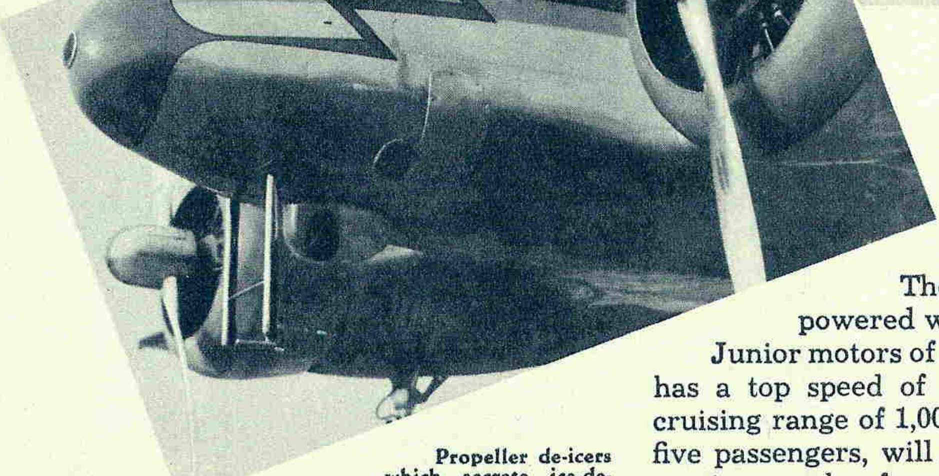
Used by the Bureau of Air Commerce as a flying laboratory, the Lockheed all-metal monoplane shown above features every known flying aid. Along the wing edges can be seen the rubber de-icers that prevent ice formation through a pulsating action caused by air shot through them from a compressor.

EQUIPPED with every known device that helps make flying safe, an all-metal Lockheed 12A air liner will be used by the U. S. Bureau of Air Commerce as an aerial "guinea pig" in which tests of the safety aids can be made under actual adverse operating conditions of rain, snow, and sleet. Bureau inspectors will operate the aircraft and its equipment.

The low-wing monoplane features the latest type of two-way radio, a radio compass, de-icers for wings and propellers, an automatic pilot, radio antennas, and constant speed propellers. Many air liners have one or more of these devices, but not all of them so results of the inspectors' tests together with suggestions, will be passed on to air line operators for their consideration.

The flying laboratory is powered with two Pratt & Whitney Junior motors of 450 horsepower each and has a top speed of 213 m.p.h. The plane's cruising range of 1,000 miles, with a pilot and five passengers, will facilitate the inspectors' routine work of examining air line pilots.

Shown above, Eugene Vidal, former Bureau of Air Commerce Director (right), and Bennet Griffin, inspector, examine a radio compass covered to keep it free from ice.



Propeller de-icers which secrete ice-destroying fluid onto blades.

CHINA'S Millions

Above—Miss PeLung, youthful star at radio station XHHS, Shanghai. Although slow to accept radio as a popular pastime, China now is making rapid strides in that direction.

The Orient opens its heart to radio and in the footsteps of the American listening public, succumbs to the appeal of native amateur hour artists.

by Robert H. Berkov

AGE-OLD China, shaking loose from centuries of tradition, has taken the radio to its heart, and loud speaker entertainment has become one of the most important influences in a nation which is fast adopting the modernism of the west in even the most outlying sections.

From bustling Shanghai and fast-growing Nanking near the eastern coast, to Chengtu in remote Szechuan province, from the far reaches of Hopei province in the north to Yunnan in the extreme southwest, countless receivers blare forth a cacophony of western and Chinese music, announcements, speeches. Out of the ether to hundreds of middle schools come the lessons and exhortations of mass-education broadcasts. In shops and homes are heard, in rapid succession, the traditional story-tellers of old Cathay and the swing music of American jazz bands from the swank

Right—A theatrical group sponsored by station XHHS. Second in popularity only to story telling, the drama draws much of the public's interest.

Twist the DIALS

hotels and cabarets of Shanghai. And once a month, to crowds reminiscent of World Series listeners in America come the stentorian voices of announcers reciting the lucky numbers of the National Lottery.

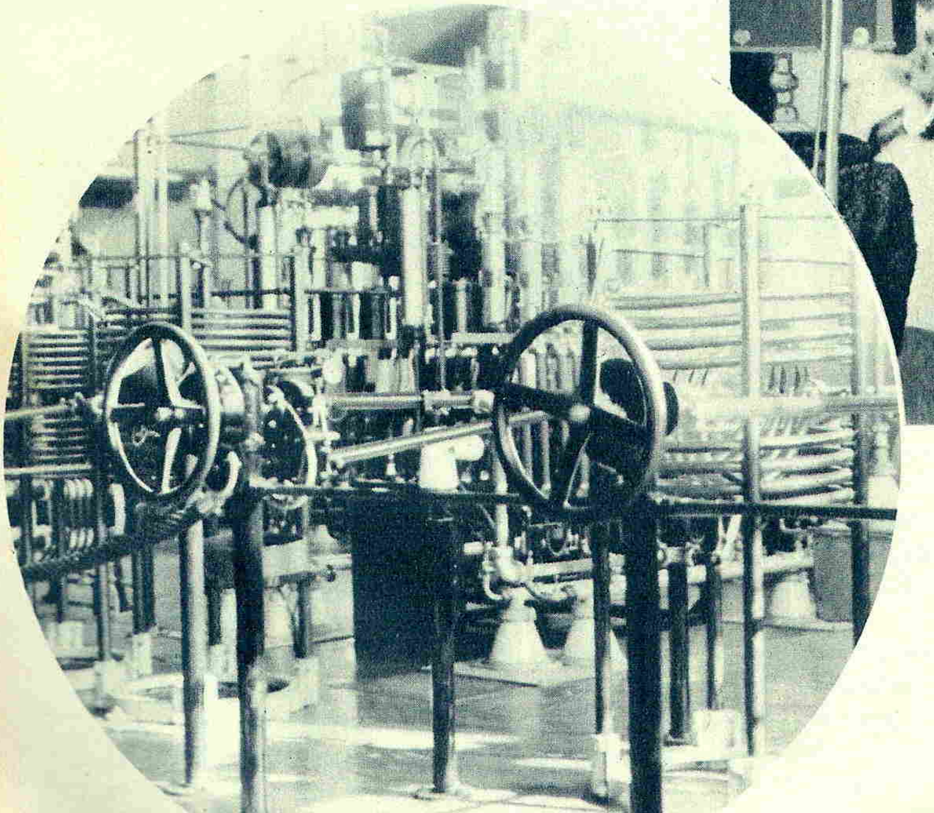
In Shanghai, largest city in China and generally deemed the most cosmopolitan community in the world, one can and does hear radio voices in English, French, Russian, German and Japanese as well as the customary Chinese with its numerous dialects and shadings of accent.

That China should become radio-minded to the extent recorded in the past few years may fail to impress Americans or Europeans as remarkable, but when it is remembered that in this country of 450,000,000 people only a pitifully small percentage are able to afford their own receiving sets, the interest shown to date is nothing less than phenomenal. In a nation where human labor is cheaper than that of animals, where thousands of men pull other men in rickshas, where a monthly salary of $30 American currency is considered high, and where millions of people pay less than 6 cents for a restaurant meal, the extent to which radio has conditioned the lives of the masses is more than impressive and the growth of the radio-entertainment business a modern miracle.

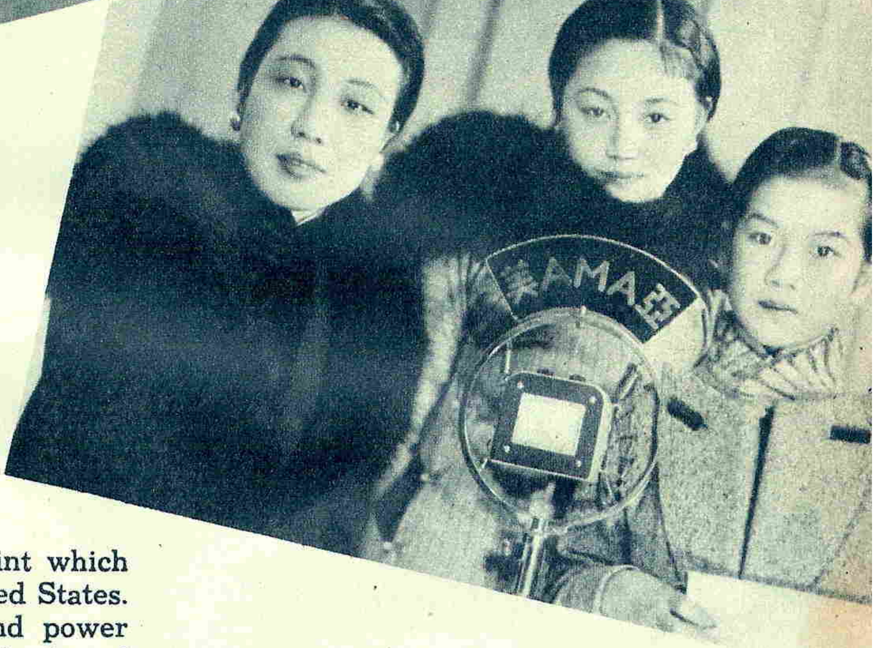
The most recent statistics show that China imports radio material and sets to the amount of about $800,000 a year, with the United States supplying the lion's share of the total.

The nation's largest and most powerful transmitter, XGOA, owned and operated by the Chinese Government at Nanking, boasts the most modern equipment and facilities, and a power of 75,000 watts, putting it in the ranks of the world's most powerful stations. But in the majority of stations equipment is crude and inefficient, broadcasting technique is in its infancy, and program arrangements and talent

Above — Generalissimo Chiang Kai-Shek, chairman of the military affairs commission, and executive Yuan president, on the air.



Left—Part of transmitter XGOA, of Nanking. The tank coils and eight water cooled tubes are shown.



Above—A pair of youthful performers in a theatrical broadcast sponsored by XHHS. Right—The Wong Sisters, artists at XHHS. Left to right: Tsai-Fong Wong, Yuen Fong Wong, Mei-Mei Wong.

have nowhere reached the fine point which they have, for example, in the United States.

But refinement of equipment and power output of the transmitters are no indication of the stations' popularity. Scores of little stations, with power ranging from 100 to 500 watts, regularly broadcast programs which boast a popularity easily comparable with that of the top-notch network performances in America.

Until now radio stations have experienced a high mortality and turn-over in China. For a time anarchy ruled the ether, and stations took to the air at their owners' whim, grabbing any frequency and call letters that suited their fancy, and shifting from one to another regardless of international usage and half-hearted attempts at regulation. Now, however, China is a member of the International Radio Convention and in the interests of harmony all nationals, including those not subject to Chinese laws, abide by the regulations and control of the Ministry of Communications. The prefix "X" is now used by all broadcast stations and allotted wave lengths are adhered to by all. Under the strict regime of the Ministry the channels have been cleared and the number of outlaw stations is infinitesimal. Today the industry is more stable than at any time in its history.

Radio broacasting was introduced into China in 1922 through the enterprise of an American firm which established a 50-watt station. Soon after its beginning, however, it was closed down, presumably because the expected financial returns did not materialize.

A second attempt was made about a year later, also by an American firm, which was engaged in selling receiving sets and accessories and went on the air with a view to stimulating its own sales. In those days, with short-wave transmission and reception confined to commercial enterprises and "hams," the hearing of entertainment programs from overseas was undreamed of, and in order to sell radio receiving sets, one necessarily had to provide something to receive. The effort lasted exactly six months before it collapsed.

In the meantime, however, the germ of radio had affected a number of young Chinese, who entered the field from the amateur ranks, and who availed themselves of every opportunity to learn more about the fascinating subject from the Americans who seemed to know more about it than any other foreigners in China. Some of the young Chinese enthusiasts went to the United States to gain first-hand knowledge from American radio engineers.

In 1924 the Kellogg company, American manufacturers of telephone and radio equipment, opened a branch office in Shanghai for the sale of its products, and at the same time inaugurated a 100-watt broadcasting station. Its equipment was subsequently sold to a series of other owners, who were on the air with a variety of stations until the equipment became obsolete and was replaced.

The year 1927 marked the first advent of the Chinese themselves into the business, as the owners of a large department store in Shanghai, sensing the advertising possibilities of radio, installed a 50-watt station. The program consisted of market reports, news summaries and Chinese music. At the same time radio first took hold in other sections of China and the Ministry of Communications set up a long-wave transmitter for the Tientsin Radiogram Bureau. In Peiping, then Peking and the capital of the nation, the telephone bureau opened a 20-watt station and subsequently increased its power to 300 watts.

By 1928 the Chinese Government definitely entered the radio business and erected a station in Chekiang to transmit government orders and important news to the various parts of the province. Starting with an output of 250 watts, the power was later increased to 2,000 watts. The same year the Central Broadcasting Station was built in Nanking, which had become the national capital as a result of the Kuomintang revolution. This station started out with 500 watts but its power was brought to its present proportions after a complete rebuilding of the station and the importation of much of its equipment from the United States.

At present there are 89 broadcasting stations in China, of which 39 are located in Shanghai. The remainder are located at strategic points throughout the country so that, although the majority are of low power, a system of re-broadcast is possible and approximates a national hook-up whenever required by the government for important announcements or programs.

The stations located in such political centers as Nanking, Kunming (Yunnanfu), Hankow, Hangchow, Chungking, Nanning, Canton, Foochow, Nanchang, Tsinan, Peiping, Chinkiang and Taiyuan are either under government control or are operated by the local provincial governments and

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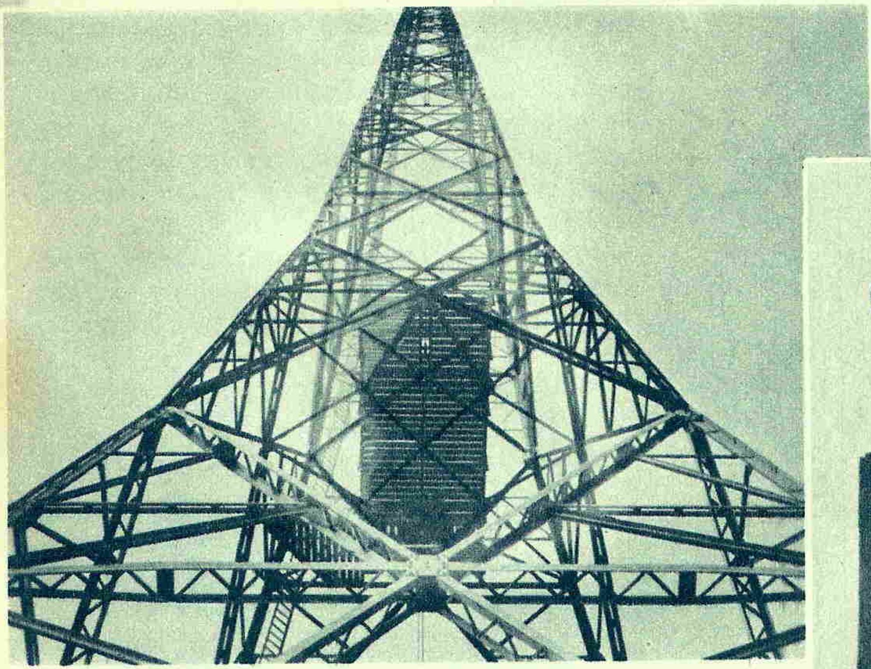
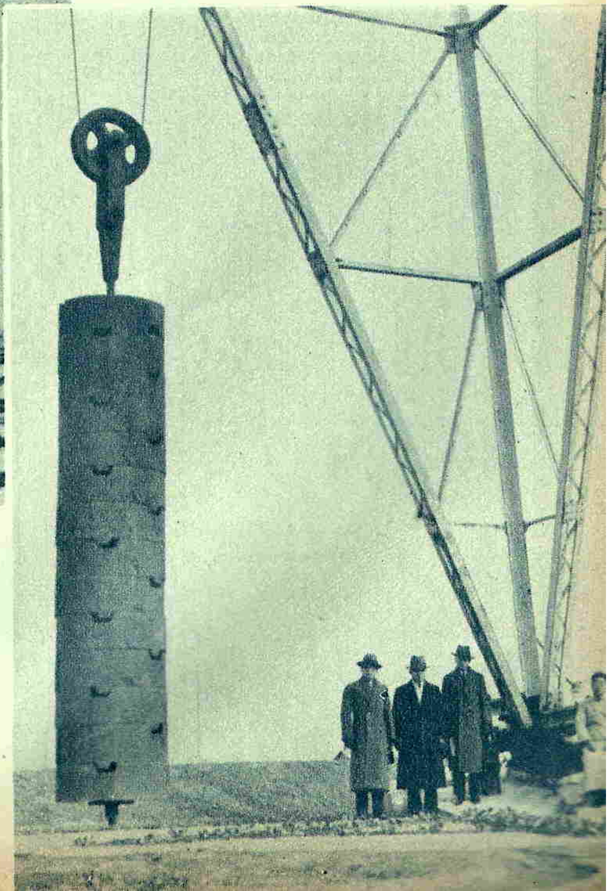
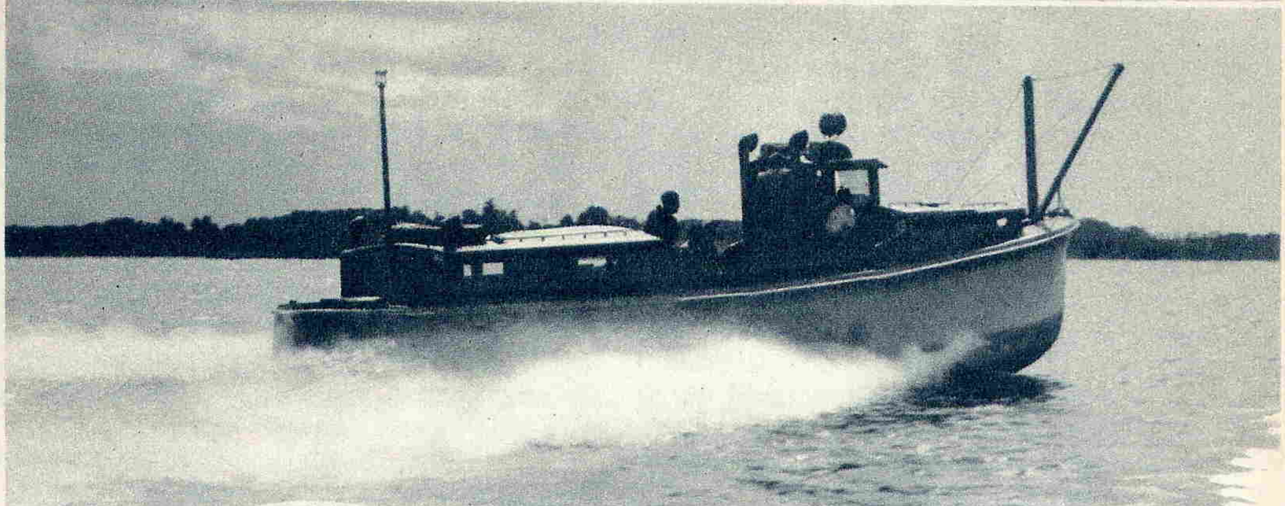




Above—View from the ground looking up at the towers of station XGOA, owned by the Chinese Government at Nanking. One of the most powerful stations in the world, the station boasts a power of 75,000 watts. Right—Counter weight on the antenna wire.

U. S. Navy Buys Air Crash Boats

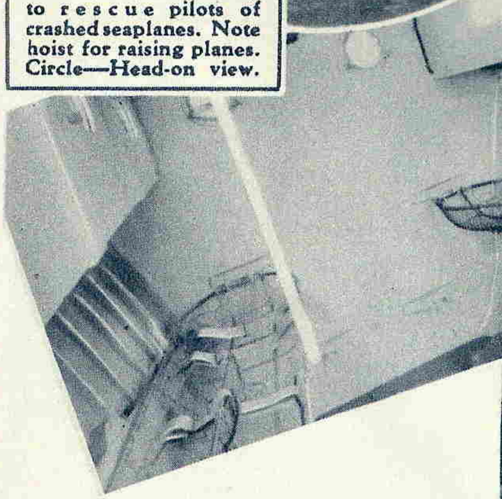


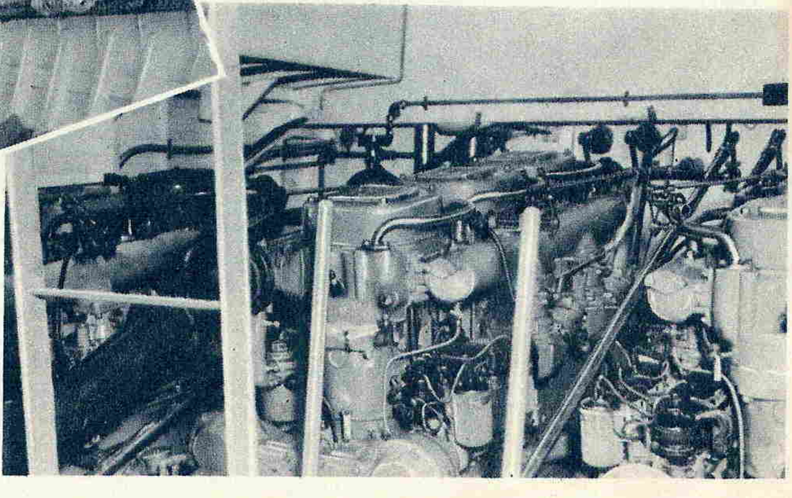
Capable of speeding at 45 m. p. h., special boats of a type shown in top photo will be used by the U. S. Navy to rescue pilots of crashed seaplanes. Note hoist for raising planes. Circle—Head-on view.

POWERED by two Packard motors of 650 horsepower each, two specially designed speed boats have been purchased by the U. S. Navy for use as crash boats to rescue Naval pilots who accidentally crash their seaplanes while landing or taking off. One of the boats will be stationed at the Navy's base at Hawaii, and the other at the Norfolk, Va., air station.

Capable of accelerating from a dead stop to 45 m.p.h. within a few seconds, the boats were built by the Luders Marine Construction Company of Stamford, Conn. With an overall length of 46 feet, the craft have a 12-foot beam. The engines are cooled by fresh water derived from storage tanks, insuring longer life than would be possible if they were exposed to the corrosive action of salt water.

The cabin of each boat is equipped with hospital equipment and the crews will give first aid treatment to injured fliers.





The Navy's new crash boats are equipped with bunks that can be removed for use as stretchers (above). Complete first aid equipment is carried aboard each boat. Photo at right shows the installation of the two 650-horsepower Packard engines that power each boat. Surface propellers are used, enabling boats to navigate shallow seaways without reducing speed.

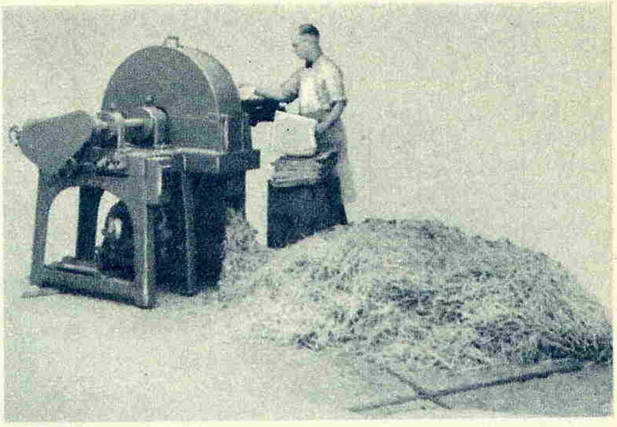
Machine Makes Excelsior From Old Newspapers

A MACHINE to turn old newspapers and magazines into paper excelsior at a 400 to 1,200-pound an hour rate, now is being manufactured.

The knives readily cut stacks of papers or magazines one-half an inch thick. They produce a slight curve or warp on each strand of the excelsior which tends to fluff it out. In the discharge spout, a heavy air blast completely separates the strands and finishes the fluffing out process.

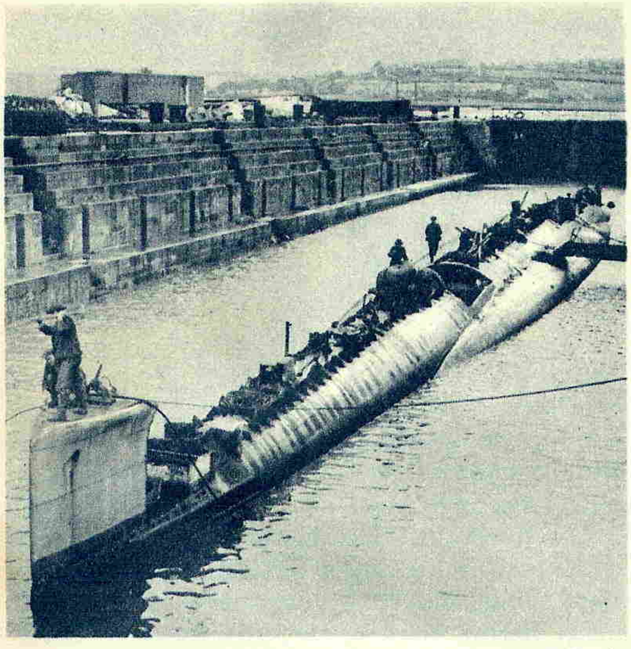
The insulation qualities of paper make it a desirable packing medium for food stuffs in cold weather, and its soft texture is easy on the tender skins of certain fruits and vegetables.

This machine makes it possible for shippers to secure paper excelsior at low cost. Old paper can be stored compactly and the excelsior made as needed.



A 50-pound pile of excelsior produced in three minutes by machine designed to make this packing medium from newspapers and magazines. Cuts 400 to 1,200 pounds an hour.

Submarines For Shipbreakers



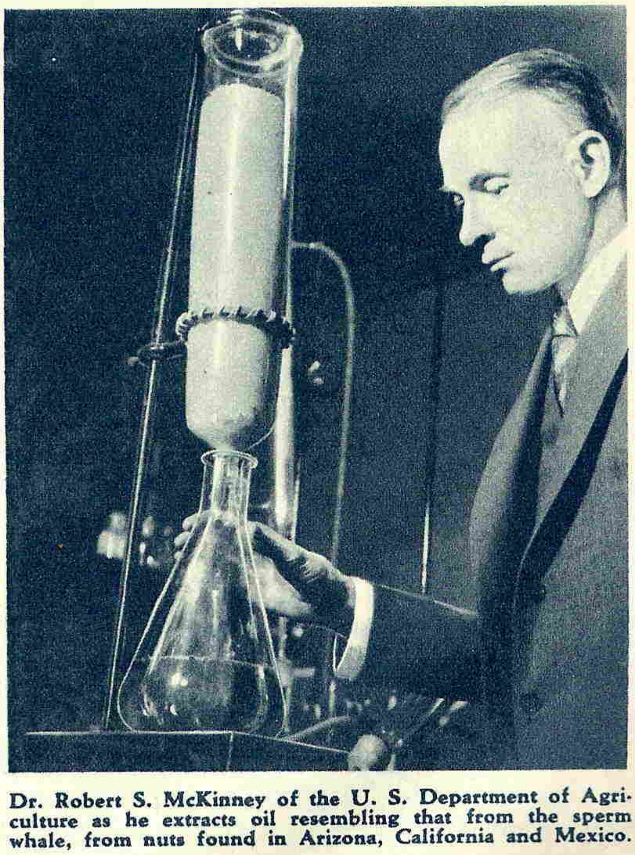
One of two submarines being dismantled at Pembroke Dock, England, giving work to the unemployed. Underwater craft were towed to their breaking up place from Portsmouth.

THE work of dismantling obsolete submarines now is giving work to the unemployed in England. Two underwater craft, taken out of service, were towed to Ward's shipbreaking establishment for the purpose of being dismantled. After arriving at the Pembroke Dock, from Portsmouth, they were placed in the drydock shown in the photo, and dismantling operations were started.

Native Nuts Yield Good Oil

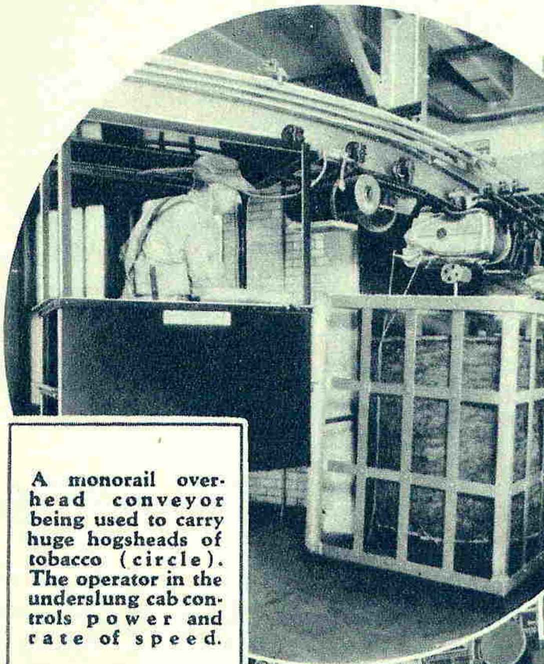
FROM the native jojoba nut seeds, Dr. Robert S. McKinney of the U. S. Department of Agriculture extracts a non-fatty oil closely resembling that from the sperm whale.

Dr. McKinney points out that the nuts are found in Southern California, Arizona, and Western Mexico, where they grow on bushes three to 15 feet high.

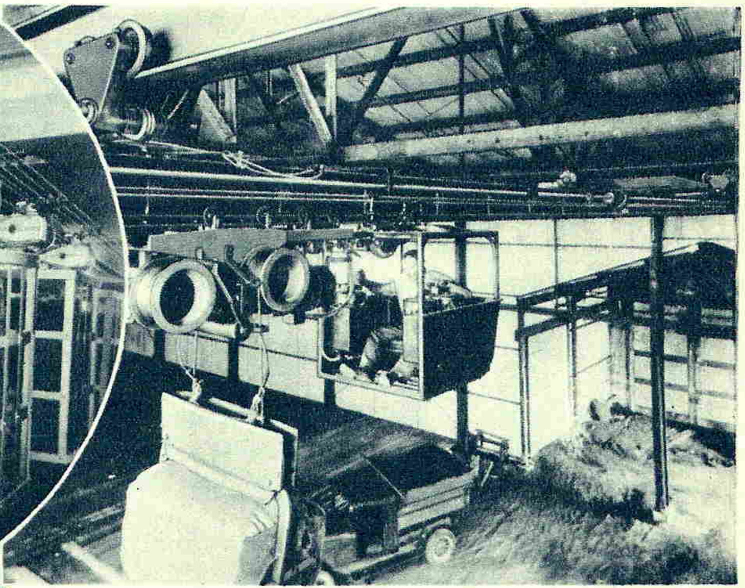


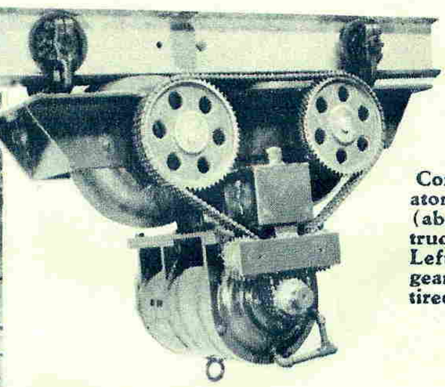
Dr. Robert S. McKinney of the U. S. Department of Agriculture as he extracts oil resembling that from the sperm whale, from nuts found in Arizona, California and Mexico.

Monorail Conveyors Aid Industry

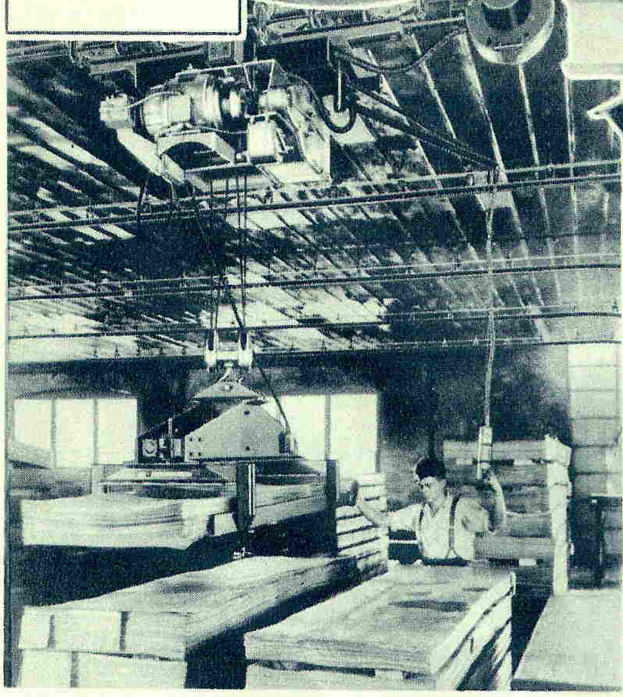


A monorail overhead conveyor being used to carry huge hogsheads of tobacco (circle). The operator in the underslung cab controls power and rate of speed.





Controlled by a cab operator, this monorail crane (above) carries an entire truckload of material. Left—Close-up showing gear motor and rubber tired traction wheels.



Three tons of sheet steel are being lifted by this monorail unit. Operator controls action with fingertip switches.

LIKE huge spiders crawling along the ceiling, monorail overhead conveyors travel throughout modern industrial plants carrying or pushing loads that formerly required back breaking effort from scores of workers. Speeds as high as 600 feet per minute, using motors of ⅙th to 4½ horsepower, make possible wide application for many unusual jobs.

Featuring electrical controls, time relays, and limit switches, monorail systems are arranged so that an automatic carrier picks up a load, travels away with it, and deposits it at any number of stations. Loads as heavy as four tons have been successfully handled.

The drive unit of a monorail device consists of a gear head motor attached to a rubber tired wheel mounted under a rail track. The inflated tire, pressing against the steel track, provides increased tractive contact. Some monorail power units are controlled from a centrally located switch panel while others incorporate an underslung cab in which an operator sits.

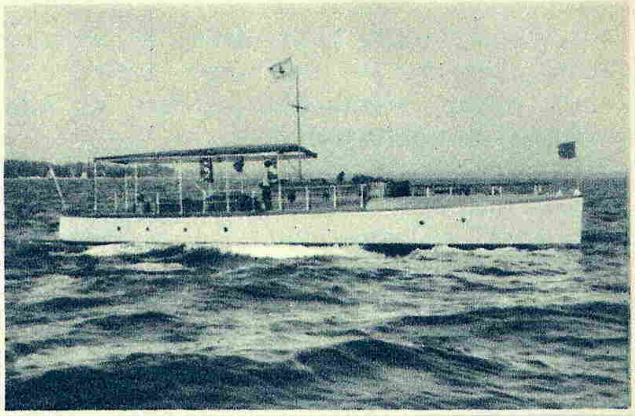
The overhead monorail systems utilize space ordinarily considered valueless which is one of the reasons why they are becoming popular with plant operators. Developed by a Lakewood, Ohio, manufacturer, the overhead conveyors are being adapted to every type of inter-plant transportation of materials.

Owner Sinks "Ailsa Craig" After 30 Years' Service

THE *Ailsa Craig's* 30-year career recently was climaxed when her owner, James Craig of New Rochelle, N. Y., took her to her last mooring, in 160 feet of water, and opened her seacocks.

Resting at the bottom of Long Island Sound, the craft had served her owner both as a pleasure craft and as a cup winner. A retired marine engine manufacturer, Mr. Craig built the first Diesel engine in America, and designed and built the engine which for 30 years powered the Ailsa Craig.

The owner vowed years ago that the craft never would come to a dishonorable end by rotting ashore, or by suffering abuse at less sympathetic hands than his own.



Top photo shows the *Ailsa Craig* with 30 years of successful service to her credit. Bottom photo shows the craft just before she disappeared from view in 160 feet of water in Long Island Sound.

New Duo-"Mike" Designed

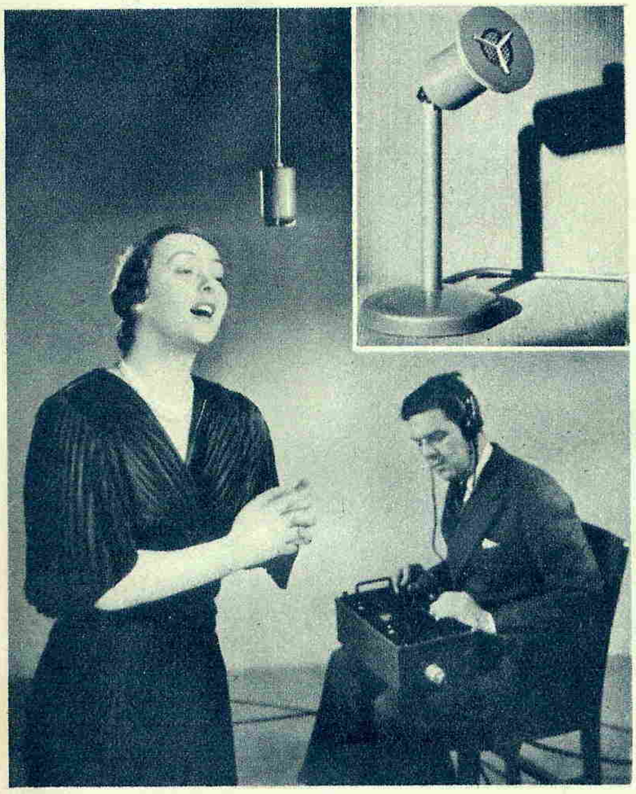


Photo shows new microphone as used when non-directional characteristics are desired. Insert shows microphone with circular baffle in place, resulting in directional response.

A NEW dynamic microphone developed by a New York firm, has both directional and non-directional characteristics at the choice of the user. When directional response is desired a small circular baffle is attached, thereby eliminating sounds other than those coming from the desired direction. When non-directional effects are desired, the baffle is removed.

Electric Eyes Protect Port

AS A protection against smugglers entering the new "free port" established at Staten Island for the benefit of foreign shippers wishing to rearrange cargoes without paying duty, a series of electric eyes have been installed in front of the piers.

If a ship crosses the beam, the circuit is broken, resulting in a warning to port officials.

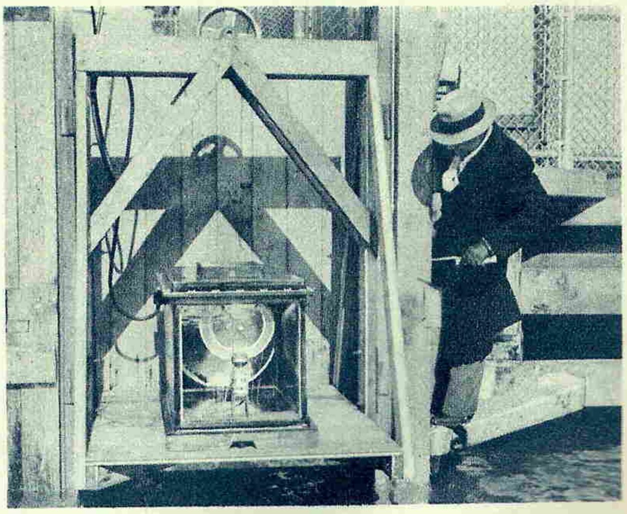


Photo shows electric eye mechanism in New York's "free port" to protect the city against smugglers. Craft crossing beam automatically sets off alarm, thereby warning officials.

The House

by Dean S. Jennings

DEAD leaves, whipped from stark lonely trees by the valley wind, sing a dirge in the night glow of a winter's moon.

Behind the skeleton screen of withered oaks whose rotting limbs droop to pungent ground, you can see the house, gabled and gaunt, rising wraith-like against a blue shadowed mountain backdrop.

They call it the "mystery house," and "the house that death built" or "ghost house."

It's the strangest structure in the world, a rambling labyrinth of 160 rooms, a $5,000,000 mass of wood and masonry set down in the heart of the peaceful Santa Clara Valley in California. Its mahogany halls have been empty these many years, its dusty rooms hollow and sad.

But there was a time when hammers pounded and saws whined; when a wrinkled old woman, listening to the commands of ghostly whispering voices, shuffled through the house and gave orders to workmen which resulted in blind stairways, chimneys without stoves, closet doors with closets, pillars upside down and many other peculiar things.

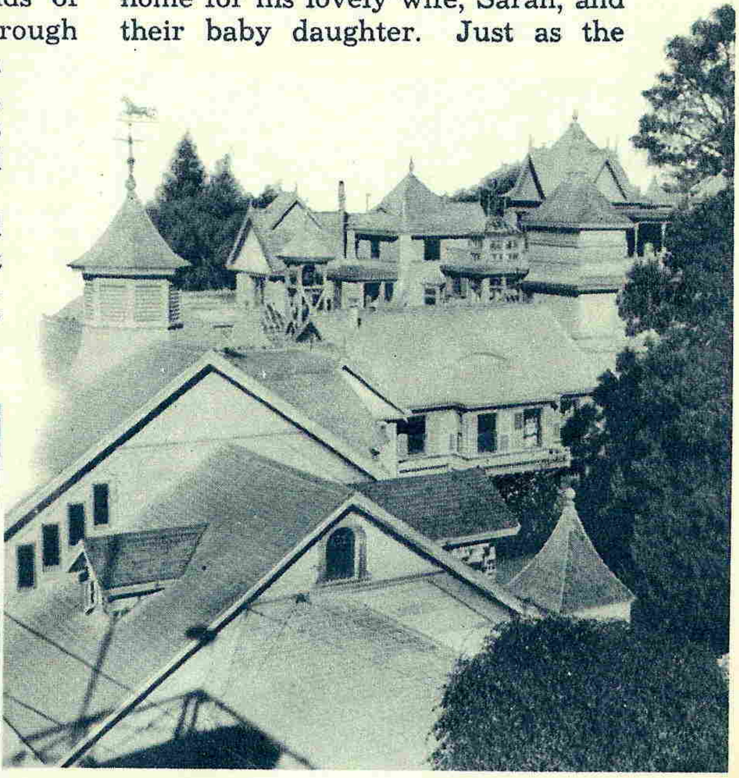
"You will live," the voices had told her decades before, "only as long as it takes to build your house. When hammers are quiet, then death will come."

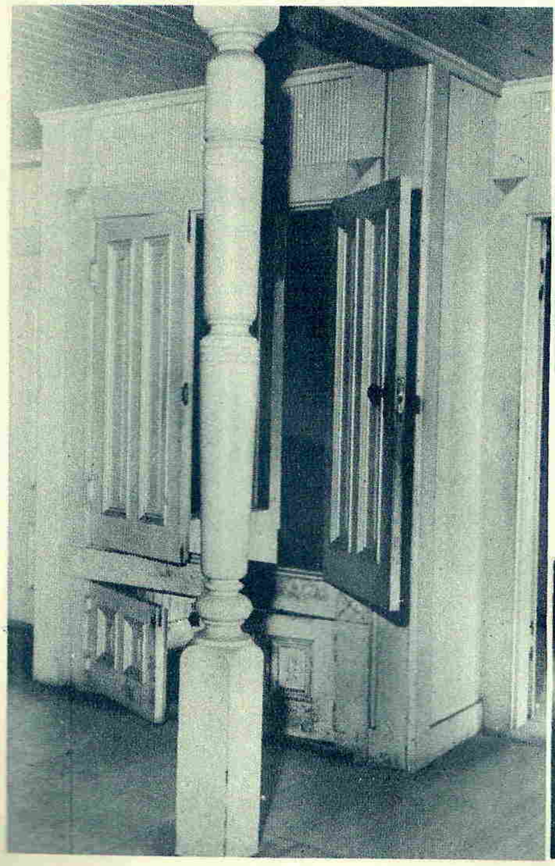
Frantic, desperate, the woman summoned an army of workmen, drove them to ceaseless toil with her bulging purse. For 38 years they labored and the house grew, like some monstrous tumor, spreading octopus-like over the estate. And it was still unfinished when death snatched her away.

Today, the house once more echoes to soft footsteps, the voices of unseen beings chatter in ancient rooms, and they say the spirits—which fled when the old woman died—have returned once more.

Before I take you through this nightmare of architecture, let's turn the calendar back for a moment. . . .

In New Haven, Connecticut, William Wert Winchester, scion of the famous rifle manufacturing family, was building a new home for his lovely wife, Sarah, and their baby daughter. Just as the





Above—The Winchester house of mystery in Santa Clara Valley, Calif., rises to a maximum height of five stories in spots, stretching out like a village in others. Few of the rooms are on a level with each other. Left—One of the upside down pillars and blind cupboards found in one of the rooms. Trap doors, blind chimneys, secret passages, all are found in this 160-room house.

house was finished, the sinister shadow over the family made its first appearance. Winchester and the baby girl died suddenly and Mrs. Winchester, stunned by the tragedy, fell into a coma so serious that physicians despaired of her life.

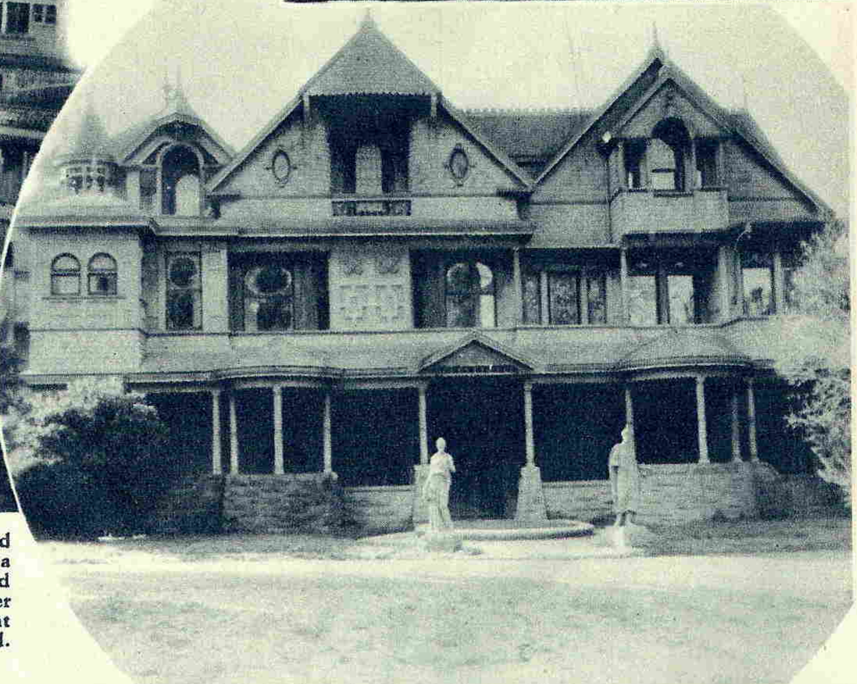
Finally she recovered and, at a friend's suggestion, visited a medium. During a seance, according to those familiar with her story, she received a communication from her dead husband in which he said:

"Sarah dear, if our house had not been finished, I would still be with you. I urge you now to build a home, but never let it be finished, for then you will live. . . ."

Fearful of electric storms so common in the East, the young widow hurried to California, bought 160 acres of land and an eight-room house. There, hiding herself from the world,

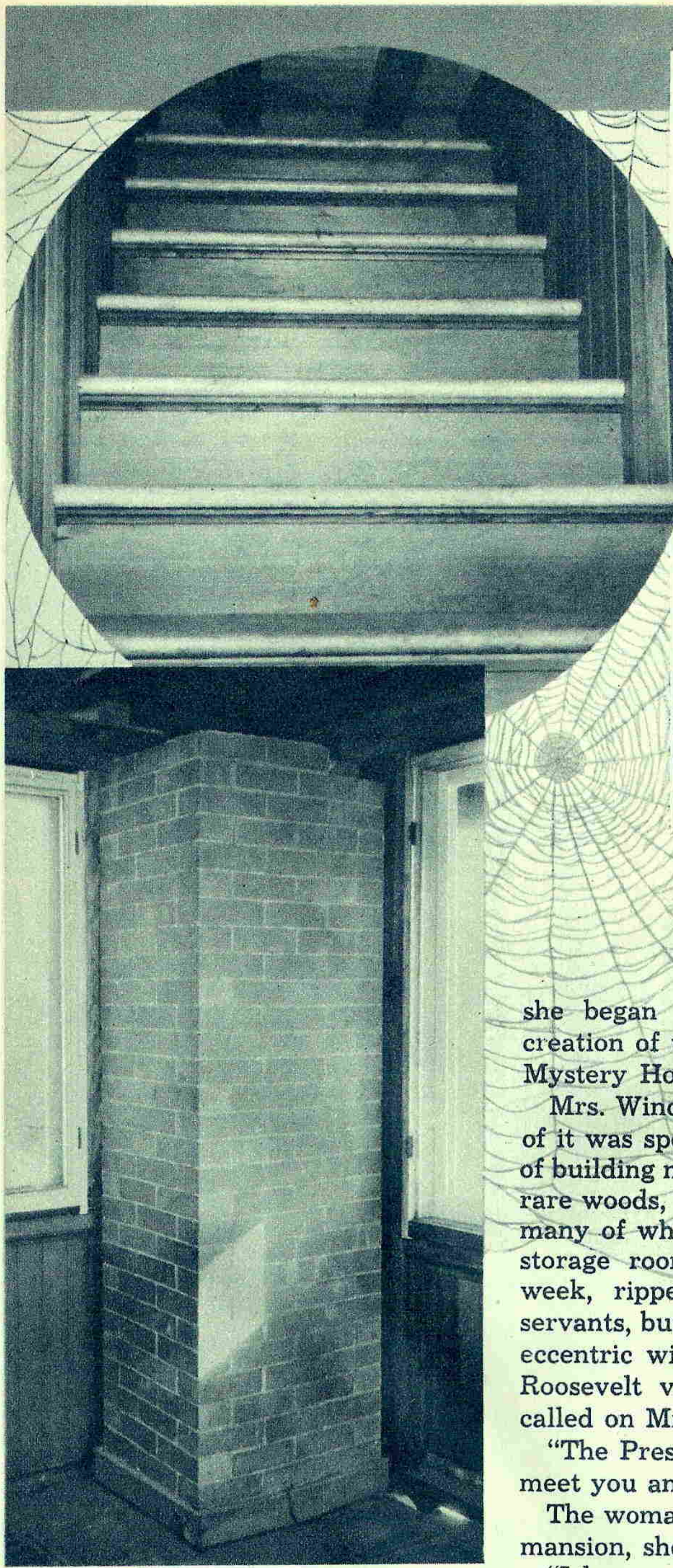
Weird, ghostly, and fantastic is this structure located in peaceful Santa Clara valley.

Right—Only known photo of Mrs. Sarah Winchester, wealthy eccentric, who kept workmen at the job of building her weird home for 38 years, the result of message received at a seance.

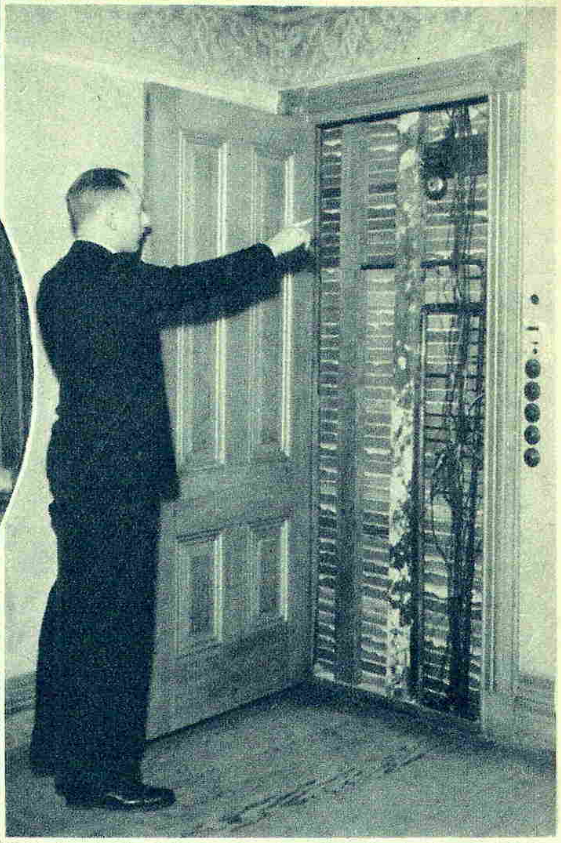


Circle—When Mrs. Winchester started to build her unusual house it was a simple eight-room home as pictured here. Unfinished at her death, after 38 years of construction, the present house covers 160 acres of land.

That Death Built



Top (Circle)—A blind stairway in the strange house. Several of these stairways, all with 13 steps, are located throughout the structure. What prompted their construction, no one will ever know. Bottom—A chimney without a stove or outlet, one of many in the house. These, and many other peculiar things, are the foundation for tales that the house was built for habitation by "spirits".



Above—A false door and secret wires leading from Mrs. Winchester's room. Bells, alarms, buzzers, and signals by which she summoned her many servants, only one of whom ever contacted her personally, abound throughout the house.

she began the incredible task which led to the creation of what is now known as "The Winchester Mystery House."

Mrs. Winchester's income was $1,000 a day. Most of it was spent on salaries to workmen, on carloads of building materials from every corner of the world, rare woods, exquisite marble, costly glass, fixtures—many of which were never used and still repose in storage rooms. Beautiful floors were inlaid one week, ripped out the next. There were many servants, but only one ever came in contact with the eccentric widow. In fact, when the late Theodore Roosevelt visited California, officials in San Jose called on Mrs. Winchester.

"The President of the United States is anxious to meet you and visit your home," they said excitedly.

The woman, peering through the front door of her mansion, shook her head.

"I have never bothered anyone," she said acidly, "I expect no one to bother me. Good day!"

Ignoring the pleas of the officials, Mrs. Winchester walked slowly back to her "blue" room, the tiny bare chamber where, in the dark hours of the night, she communed with invisible friends.

[*Continued on page* 132]

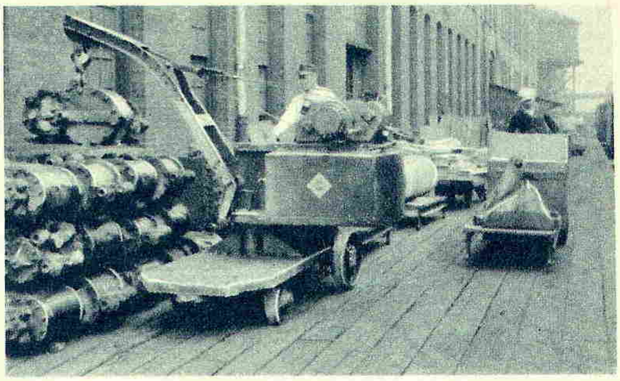
Portable Electric Crane Handles 3,000-Pound Load

A COMPACT portable crane having a lifting power of 3,000 pounds is operated by electricity. Suitable for handling bulky castings, the machine has a seven-foot radius. Capable of a six-mile an hour speed, the crane has three speeds forward and three reverse.

Travel controller and brake pedal are so interlocked that the truck cannot be operated unless the operator is standing on the pedal platform at the rear.

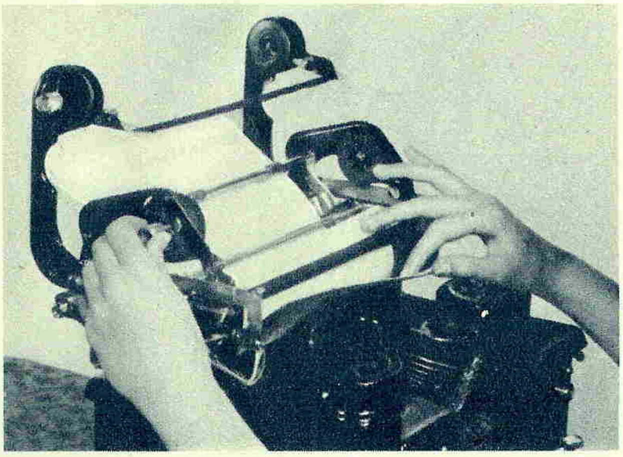
The six-foot, nine-inch boom is raised and lowered by a single motor, double drum, hoist unit mounted on top of the battery box. A hand operated clutch transfers hoisting power from hook to boom and vice versa.

This crane may be equipped with many sizes of booms, both telescopic and fixed.



This portable electric crane moves about at 6 m. p. h. speed and is designed to handle bulky castings and large, irregular shaped materials. Has three speeds forward and three reverse.

Device Makes Original Copy



Capable of making from one to five original copies on any typewriter, this device may be attached with a screwdriver. Copies are produced by ribbon between each sheet.

A DEVICE capable of making from one to five original copies at the same time on any typewriter, has recently been marketed by a middle-western concern.

The attachment feeds a ribbon along between each sheet of paper, and each copy produced is legible and permanent. The ribbons between the sheets are said to outlast four or five ribbons on the typewriter itself.

The device entails no alteration to the typewriter for installation, and the only tool necessary is a screw driver.

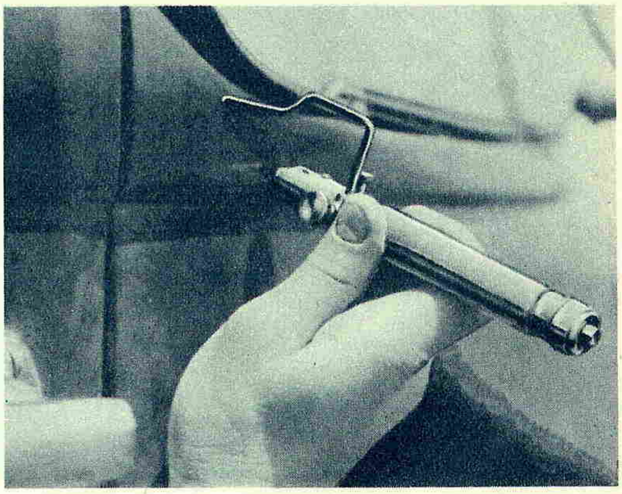
It is especially useful for typing papers likely to be used in court, as some states and courts do not consider carbon copies as competent evidence.

Gear Pump Controls Striper

THIS striping device for painting several widths of stripes on automobiles does not depend on gravity or compressed air for its operation but supplies the paint to the surface by means of a gear pump operating at a speed similar to that of the knurled striping wheel.

If the wheel is revolved slowly the paint flows slowly and if the wheel is revolved at a greater speed the pump operates just as fast in order to supply the paint uniformly and constantly.

Various heads which may be attached to the striper are used for giving a series of four different widths of stripes. A valve in the head of the paint chamber is pressed occasionally to relieve the vacuum created by removal of the paint. A needle valve in the side of the machine is regulated to increase or reduce the paint flow.



A gear pump controls the flow of paint in this striper. High speed use causes a corresponding fast flow of paint to surface. Various width stripes are possible according to head used.

Air Line Conducts Altitude Test With Oxygen

Dr. E. H. Padden, United Air Lines flight surgeon (extreme right), tests reactions of Charles Stead (front left), Grant Anderson (rear left), Karl Kalberer (front right), and E. J. Smith (rear right), to high altitude flight, while Margaret Simmons, secretary, takes notes. Tubes supply oxygen.

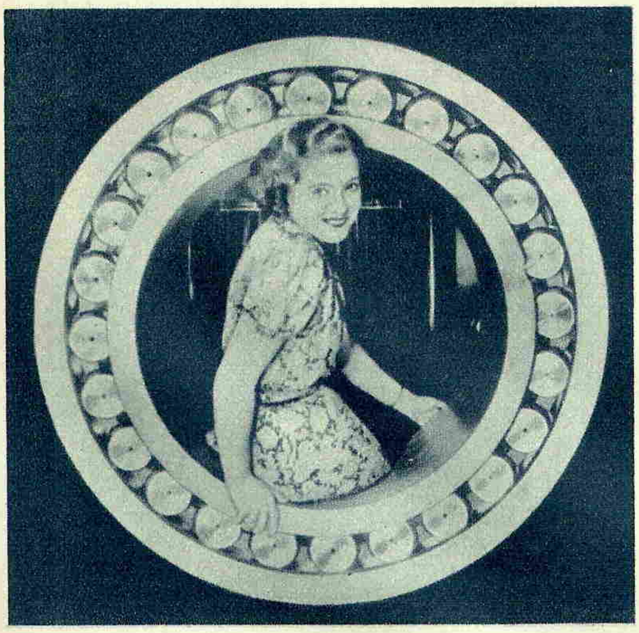
FITTED with both individual and group oxygen distribution equipment, a United Air Lines transport plane carried two company pilots, two aviation students, a secretary and a doctor to heights of 16,000 to 22,000 feet in order to conduct scientific tests of the effect of high altitude flying on human beings. Dr. E. H. Padden, flight surgeon, made tests and observations by giving the group arithmetic problems to solve while flying through the rarefied upper air.

Effects of oxygen starvation varying from slowing down of reactions and confusion of reasoning processes to momentary loss of memory were noted and corrected by use of a special dehydrated type of oxygen.

Huge Roller Bearing Built

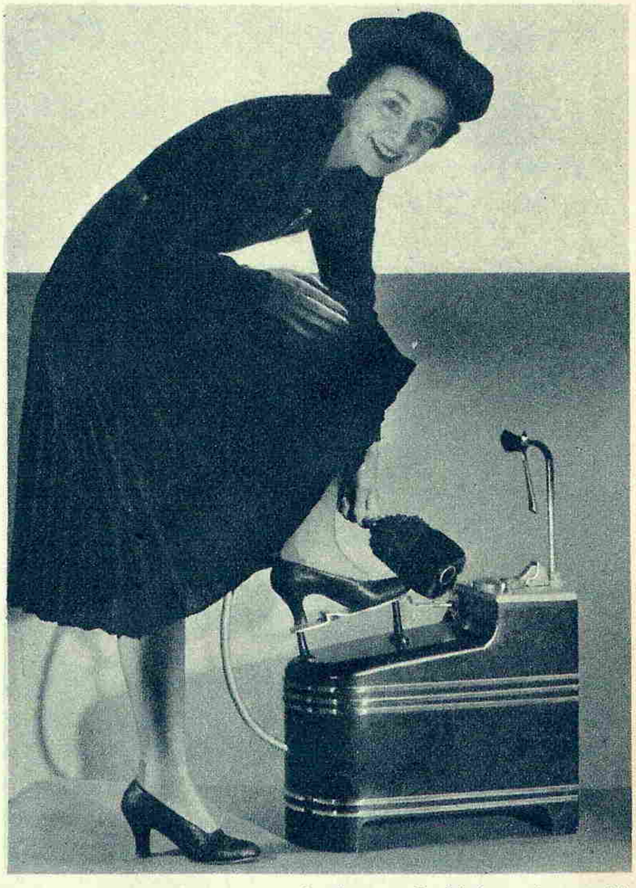
ONE of the largest spherical roller bearings in the world has been manufactured by SKF Industries, Inc., of Philadelphia, Pa. The bearing has an outside diameter of 46½ inches, a bore of 27½ inches, and is 15⅛ inches in width.

The massive bearing weighs approximately two tons and Soviet Russia has placed orders for over 23 tons of the bearings for use in the Zaporojstal cold steel mill developed by an American firm, the United Engineering & Foundry Company, of Pittsburgh, Pa.



Weighing two tons, this huge spherical roller bearing was manufactured by SKF Industries of Philadelphia, Pa. Lucille Louthen sits within bearing to illustrate its unusual size.

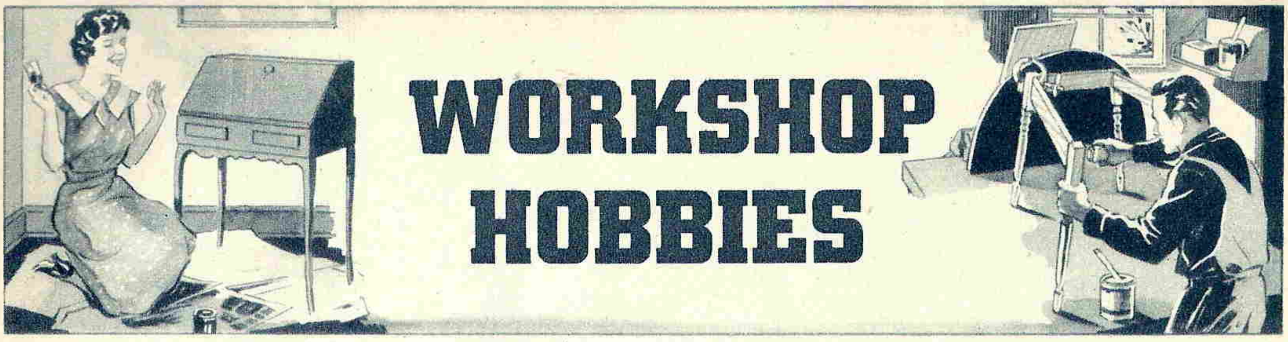
Electric Shiner Developed



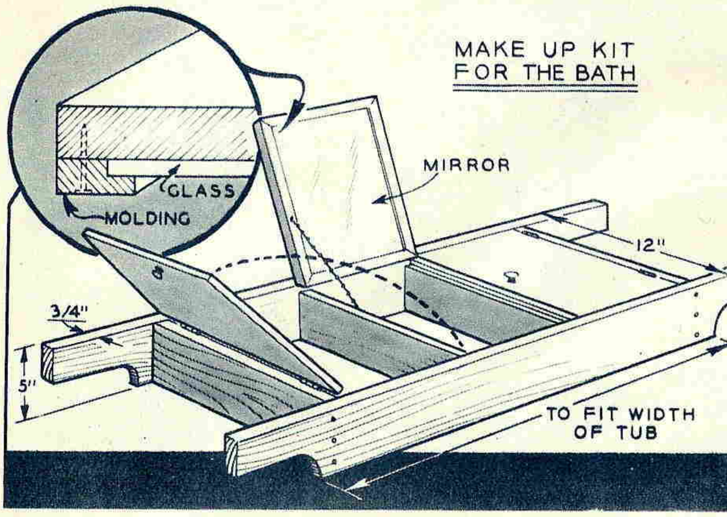
Considerably reducing the drudgery of shining shoes, this shiner device features an electrically driven brush and buffer. Lilyan Grafft demonstrates flexible cable brush attachment.

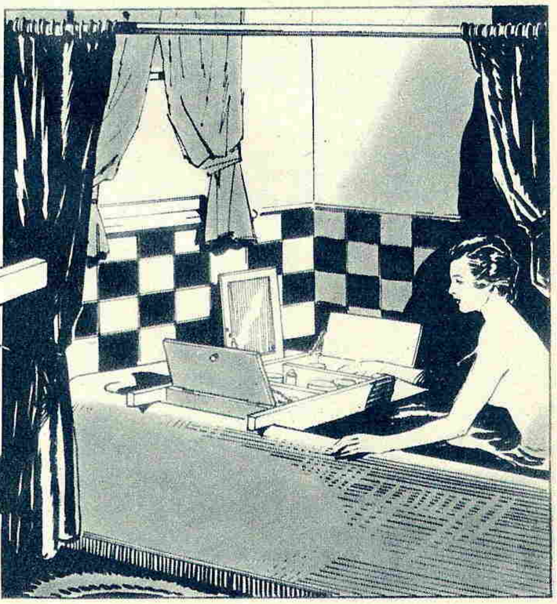
AN ELECTRICAL shoe shining device designed to operate at the flip of a switch or through insertion of coins has been developed by a Chicago, Ill., manufacturer.

The device has an electrically driven brush and buffer attached to a flexible cable for rapidly producing a shine.


WORKSHOP
HOBBIES

A Make-Up Kit For Milady's Bath


MAKE UP KIT
FOR THE BATH
MIRROR
GLASS
MOLDING
12"
3/4"
5"
TO FIT WIDTH
OF TUB



Assembled from pine, this bath tub make-up kit contains ample space for skin lotions, cold creams, cleansing tissues and other beauty aids. It also contains a mirror that folds into the cabinet when not in use. Dimensions can be altered to suit.

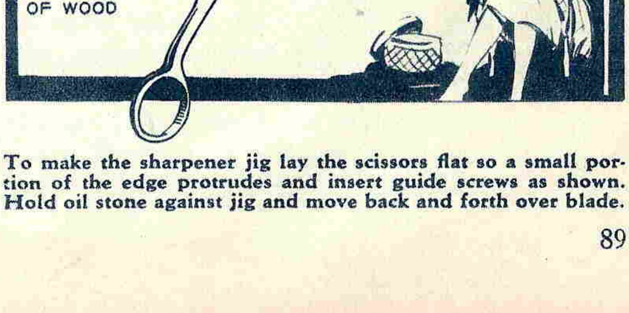
THIS distinctively different make-up kit is one workshop project that will delight any woman or girl who is fortunate enough to receive it. Made from solid pine stock or, if preferred, plywood, the cabinet when finished in waterproofed enamels to match bathroom fixtures is truly a unique accessory.

The sides of the cabinet are cut out to form runners which permit it to be placed across the tub. Make these pieces from 5-inch by ¾-inch stock recessed at each end so that a firm fit is obtained. Next cut four pieces of the same stock as used for the runners to 12-inch lengths and assemble to the runners to form the make-up kit partitions. A sheet of plywood is attached to the underside to form the bottom, fastened in place with small brads and glued.

Make the three lids also from ¾-inch stock. The two outer lids open to the side and are attached to the end pieces with small brass hinges which are mounted inside the cabinet. The center lid lifts upward and contains a mirror mounted in moulding. A light chain holds the lid in position.

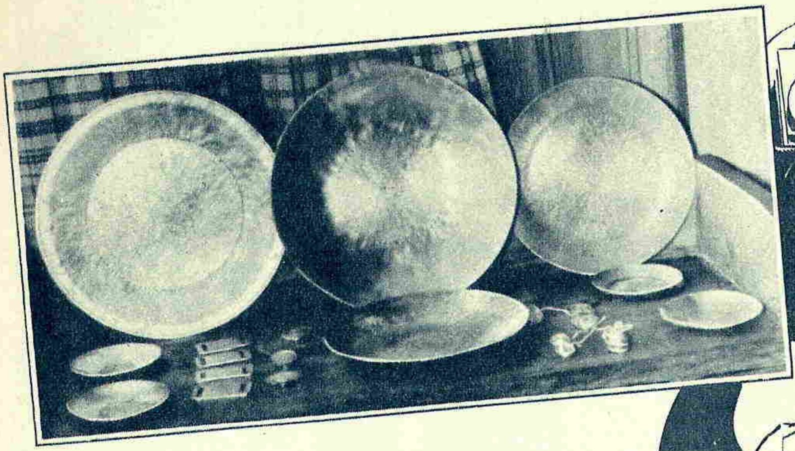
Jig Quickly Sharpens Scissors

A QUICK and effective way to put a sharp edge on a dull pair of scissors requires only a block of wood, two wood screws and a small oil stone. Lay the scissor blade along one edge of the block so that it protrudes slightly, and rub stone lightly across edge.

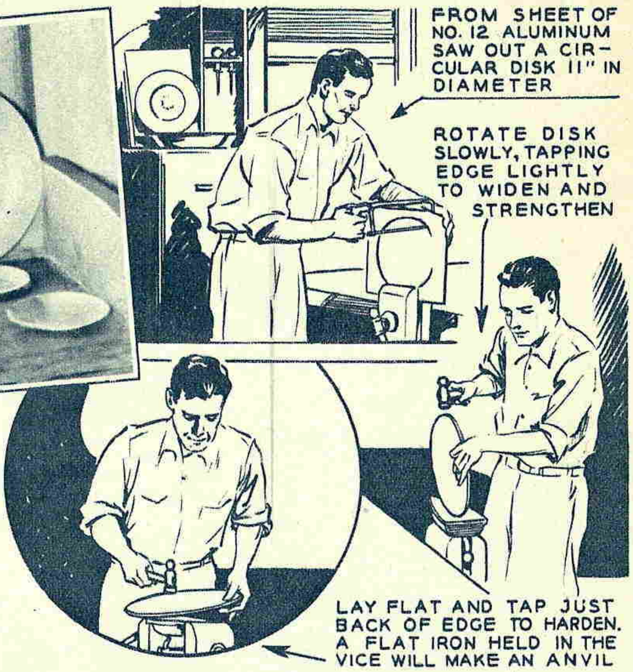

OIL
STONE
STONE IS
HELD PERPENDICULAR
AND RUBBED
ALONG BEVEL
OF SCISSORS
CUTTING EDGE
OF SCISSORS
"EDGED" TO
SIDE OF BOARD.
HELD WITH SCREWS
BLOCK
OF WOOD

To make the sharpener jig lay the scissors flat so a small portion of the edge protrudes and insert guide screws as shown. Hold oil stone against jig and move back and forth over blade.

HAMMERING ALUMINUM INTO



These charming pieces of hammered aluminum ware add a distinctive tone to any home. Formed from ordinary sheet aluminum, they are extremely inexpensive to make.


FROM SHEET OF NO. 12 ALUMINUM SAW OUT A CIRCULAR DISK 11" IN DIAMETER
ROTATE DISK SLOWLY, TAPPING EDGE LIGHTLY TO WIDEN AND STRENGTHEN
LAY FLAT AND TAP JUST BACK OF EDGE TO HARDEN. A FLAT IRON HELD IN THE VICE WILL MAKE AN ANVIL

by L. B. Robbins

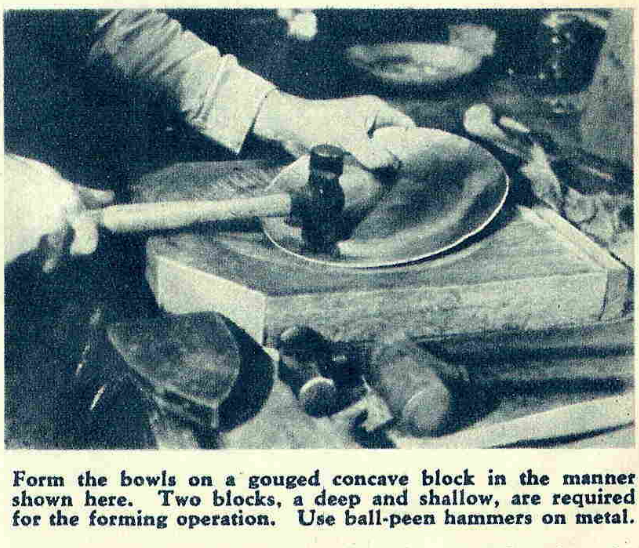
MOST of us are familiar with hand hammered copper and brass ware and the ingenious table and ornamental articles produced from wrought iron and other base metals. But hand hammered aluminum is another story for only recently has its adaptability to such uses been fully recognized.

Productions possessing all of the charm of old pewter, the loveliness of silver, the ruggedness of steel and the daintiness of cut-glass can be created in the home workshop without the use of special tools. Anyone with a leaning towards metal working and an artistic eye can, at least, make acceptable aluminum ware and thus add many interesting and valuable pieces to his or her collection of handmade table ware.

Not all grades of aluminum are suitable for hand hammering. For the average bowl, platter or other large dish No. 12 B & S gauge sheet aluminum is used. For smaller pieces such as pin trays and saucers No. 14 gauge is suitable. In all cases use only type 2 SO soft tempered sheet aluminum. The essential tools are a small anvil such as an upturned flat-iron, two or three sizes of ball-peen hammers, suitable engraving tools, several nail-sets with points having different designs, tin snips, small metal saw or jig-saw using .01-inch thick blades with 21 teeth to the inch, wooden forms, dividers, and steel wool. Two hammers should be wrapped with electricians tape to soften the blows. If no engravers tools can be procurred grind down several three cornered files to form sharp cutting tools and attach to broad handles to fit the palm. The wood forms consist of wide hard wood boards 2 inches thick with uniformly shaped hollows to conform to the shape of the dish. One can be half depth and the other full depth. These are shown in the sketches in detail. They can be hand gouged or better still, can be turned out on a lathe so they will be true and uniform.

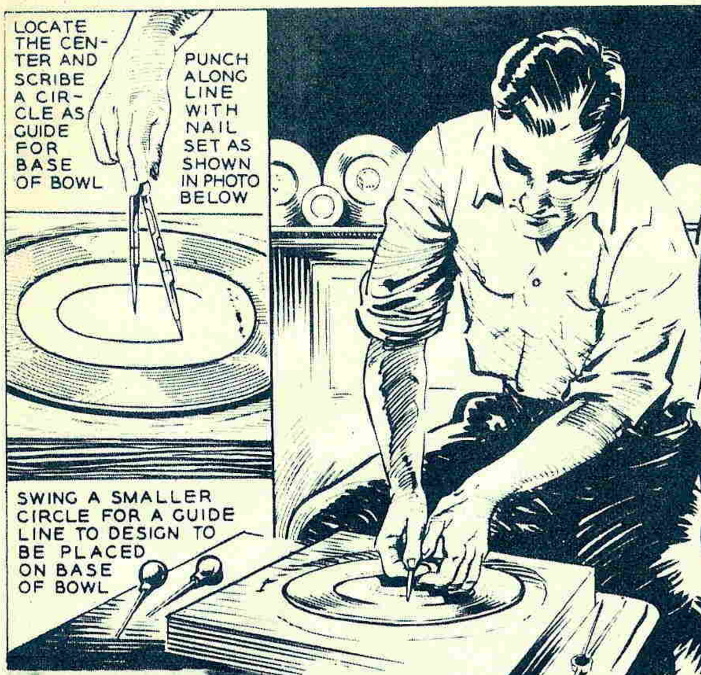
With everything in readiness start with the making of the bowl shown in the accompanying photographs. When completed, this article will measure about 10 inches across the top and about 2 inches deep.

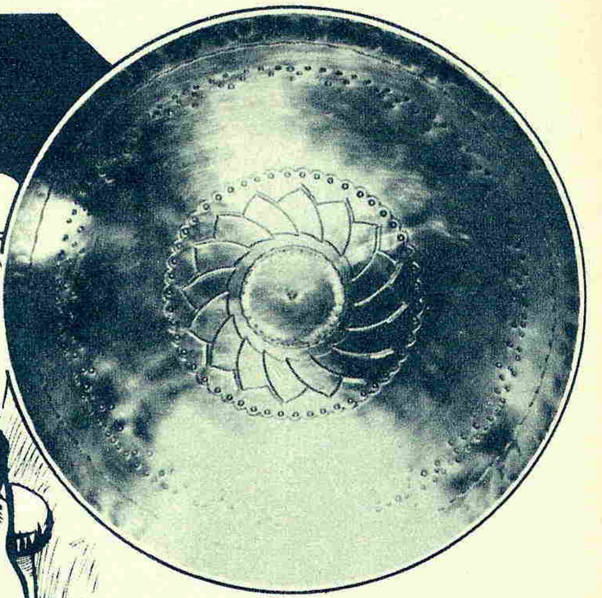
First a circular disc of No. 12 aluminum is sawed out on a jig-saw to 11 inches in



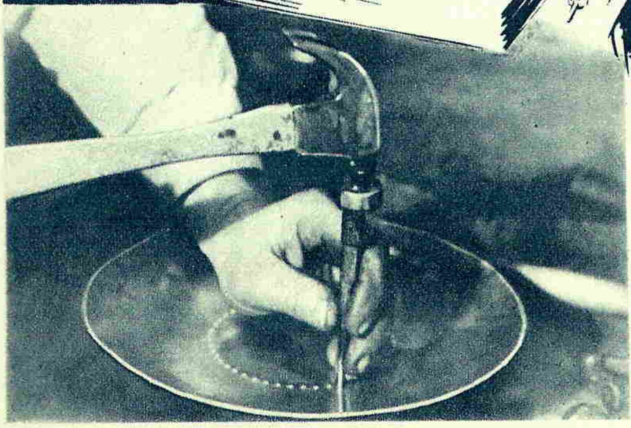
Form the bowls on a gouged concave block in the manner shown here. Two blocks, a deep and shallow, are required for the forming operation. Use ball-peen hammers on metal.

Beautiful METALWARE Articles


LOCATE THE CENTER AND SCRIBE A CIRCLE AS GUIDE FOR BASE OF BOWL
PUNCH ALONG LINE WITH NAIL SET AS SHOWN IN PHOTO BELOW
SWING A SMALLER CIRCLE FOR A GUIDE LINE TO DESIGN TO BE PLACED ON BASE OF BOWL



This beautiful hammered aluminum bowl is an example of the possibilities offered by sheet aluminum. Engraving was accomplished with nail-sets and a ground-down file. Plot out the size of the bowl with a pair of calipers as outlined in the illustrations which appear at the left.

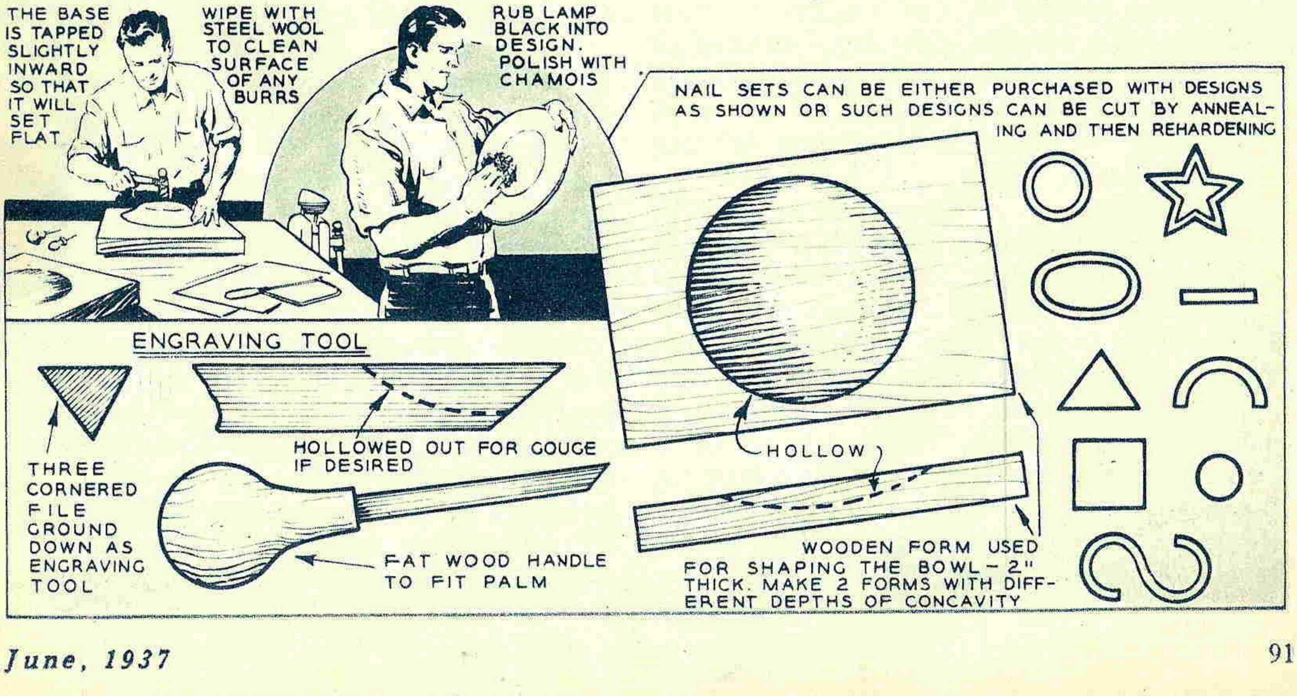


Apply the engraving marks by tapping with quick sharp blows using nail sets of various designs such as shown below. Make engravings with files shaped into gouges.

diameter. It is then rotated slowly around the edge on the anvil and lightly tapped with the unwrapped hammer to slightly widen and strengthen it. Next lay the aluminum flat and tap the surface just back of the edge to slightly harden it. The center is located and a scratch mark made with the dividers to form a 3-inch circle which will represent the base.

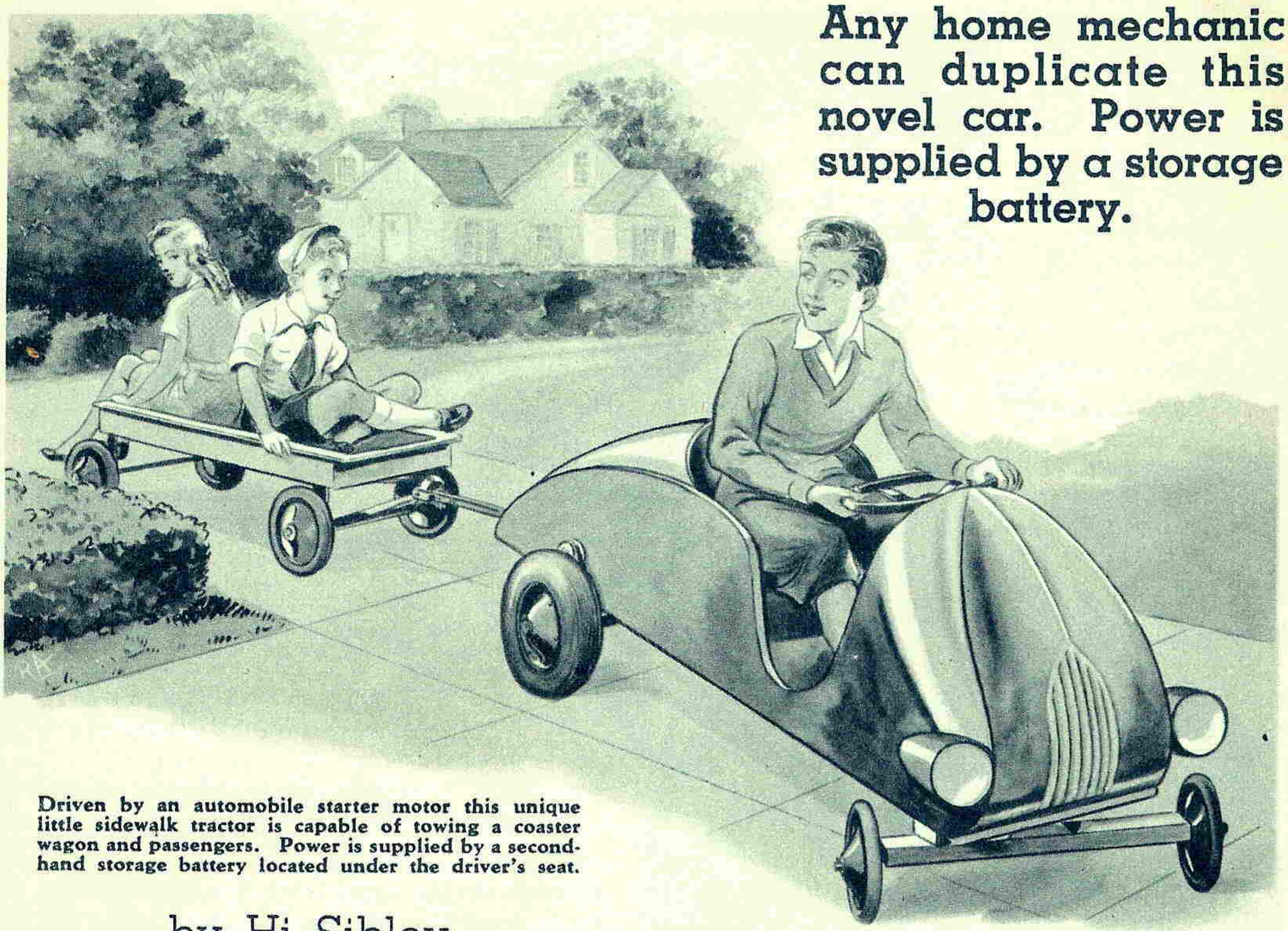
Make two wooden forming bowls described in the illustrations and place the disc over the shallow form, centering it so that the rim coincides reasonably well with the

[*Continued on page* 122]


THE BASE IS TAPPED SLIGHTLY INWARD SO THAT IT WILL SET FLAT
WIPE WITH STEEL WOOL TO CLEAN SURFACE OF ANY BURRS
RUB LAMP BLACK INTO DESIGN. POLISH WITH CHAMOIS
NAIL SETS CAN BE EITHER PURCHASED WITH DESIGNS AS SHOWN OR SUCH DESIGNS CAN BE CUT BY ANNEALING AND THEN REHARDENING
ENGRAVING TOOL
HOLLOWED OUT FOR GOUGE IF DESIRED
THREE CORNERED FILE GROUND DOWN AS ENGRAVING TOOL
FAT WOOD HANDLE TO FIT PALM
HOLLOW
WOODEN FORM USED FOR SHAPING THE BOWL—2" THICK. MAKE 2 FORMS WITH DIFFERENT DEPTHS OF CONCAVITY

STARTER MOTOR POWERS

Any home mechanic can duplicate this novel car. Power is supplied by a storage battery.



Driven by an automobile starter motor this unique little sidewalk tractor is capable of towing a coaster wagon and passengers. Power is supplied by a second-hand storage battery located under the driver's seat.

by Hi Sibley

AN ELECTRIC-POWERED sidewalk car that will thrill any youngster can be built in the backyard garage by any ambitious dad at practically no cost. The tiny car, driven by an automobile starter motor, has a maximum speed of seven miles per hour and is capable of towing coaster wagons, scooters and tricycles without difficulty. Connected each night to a trickle battery charger the car's storage battery will take on a charge which will be more than sufficient for one day's operation.

The auto chassis is formed from 2 by 2-inch hardwood sills or any similar stock which may be available. A 32-inch wheelbase is employed with the overall chassis dimension left entirely to the discretion of the builder. Where streamlining is incorporated in the design the length is naturally increased to compensate for this. The chassis width is only 12 inches, but nevertheless sufficient. A flooring of ½-inch plywood is inserted over the sills extending from the front end to the rear axle location. The remaining part of the chassis is left open to allow for the pulley drive. Fasten down the floor board with wood screws to insure a rigid job, then proceed with the axle assembly.

The front steel axle is set in a groove cut in a length of 2 by 3-inch stock and a carriage bolt used for a king pin. The steering post is formed from a length of ¾-inch cold rolled steel to which is attached a steering wheel salvaged from a Model T Ford. A large wooden spool is driven on the opposite end of the steering post after it has been mounted on the chassis. Sash cord wound around the spool connects to the front axle to complete the steering mechanism. A spring connected between one rope and the screw eye on the axle acts as an equalizer to take up the slack in the rope when rounding corners.

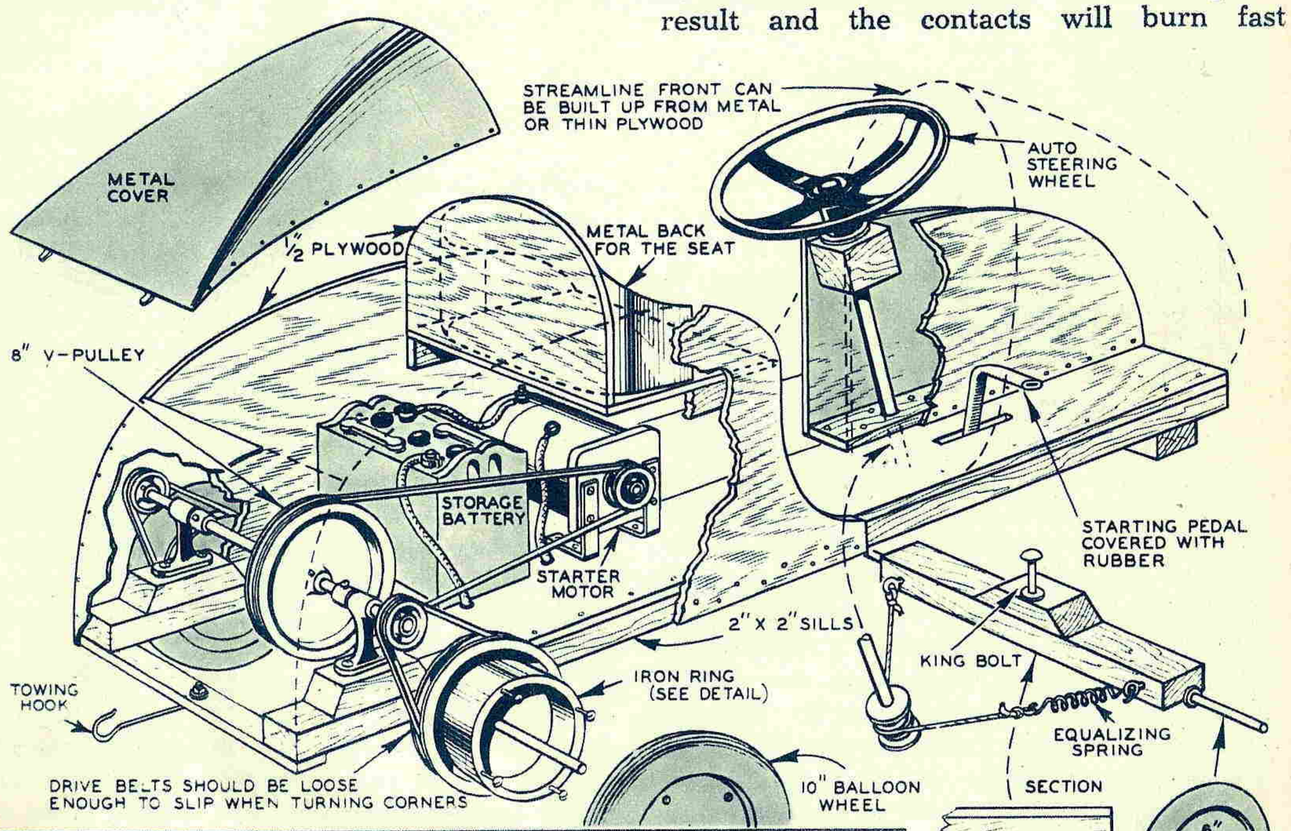
The motor assembly is next taken up. Mount the Model T starter motor an two angle brackets and fasten to the floor board with machine bolts. The correct location for the motor is directly under the driver's seat as indicated in the accompanying illustrations. The jackshaft is mounted in a pair of ordinary workshop shaft bearings. A large pulley is fastened to the shaft for the power take-off and

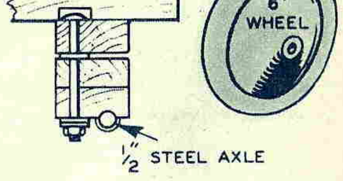
KIDDIE SIDEWALK TRACTOR

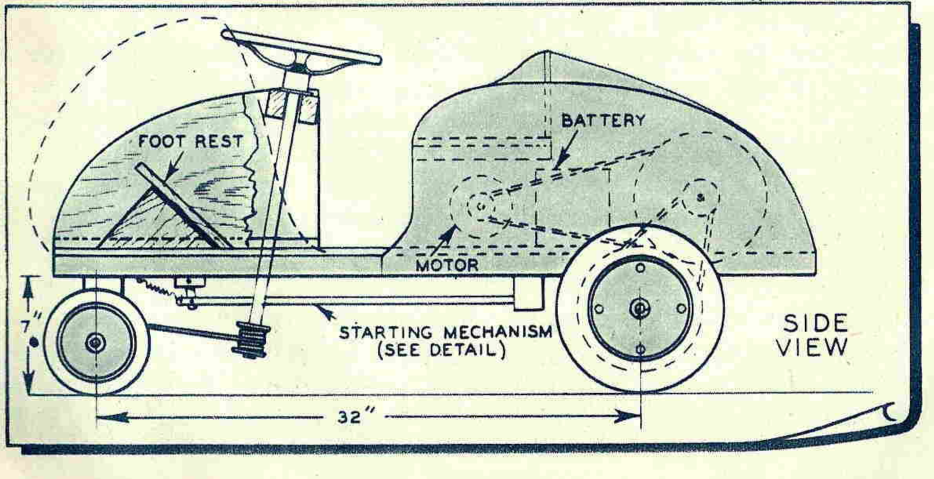
a similar diameter pulley attached to each of the rear drive wheels. In attaching the large 8-inch pulleys to the drive wheels a stand-off arrangement is required so that the pulleys will clear the doughnut tired wheels. Two rings cut from an old auto generator housing provide satisfactory stand-off mountings. The rings are drilled and tapped for ¼ machine screws on each side and the wheel assembled as shown in the detailed perspective diagram.

The wheels on the steering axle are of the ordinary coaster wagon type to permit easy steering of the tiny electric car. Rear wheels, of course, are regular doughnut types on which midget auto pneumatic tires are fitted.

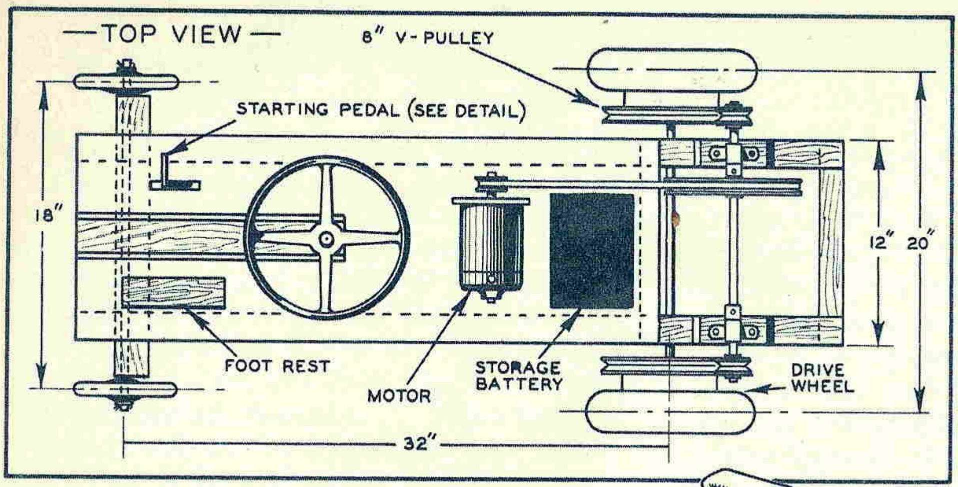
The starting switch connects between one lead of the battery and the frame of the starter motor. A simple make-and-break switch operated by the driver's foot sets the car in motion when it is depressed. Releasing the pressure on the switch automatically opens the circuit and stops the car. The switch is located under the chassis in the vicinity of the motor and connected to the foot pedal by means of an extension bar of 18 by ¾-inch strap iron. The switch is mounted on two wooden blocks and is composed of a brass or copper arm which is forced between two spring brass or copper clips. These clips must be of sufficient thickness otherwise arcing will result and the contacts will burn fast

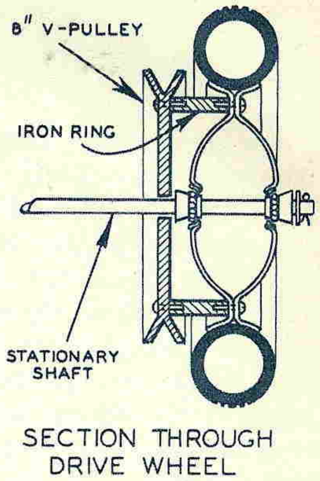

STREAMLINE FRONT CAN BE BUILT UP FROM METAL OR THIN PLYWOOD
METAL COVER
AUTO STEERING WHEEL
½" PLYWOOD
METAL BACK FOR THE SEAT
8" V-PULLEY
STORAGE BATTERY
STARTER MOTOR
STARTING PEDAL COVERED WITH RUBBER
2" X 2" SILLS
KING BOLT
TOWING HOOK
IRON RING (SEE DETAIL)
EQUALIZING SPRING
DRIVE BELTS SHOULD BE LOOSE ENOUGH TO SLIP WHEN TURNING CORNERS
10" BALLOON WHEEL

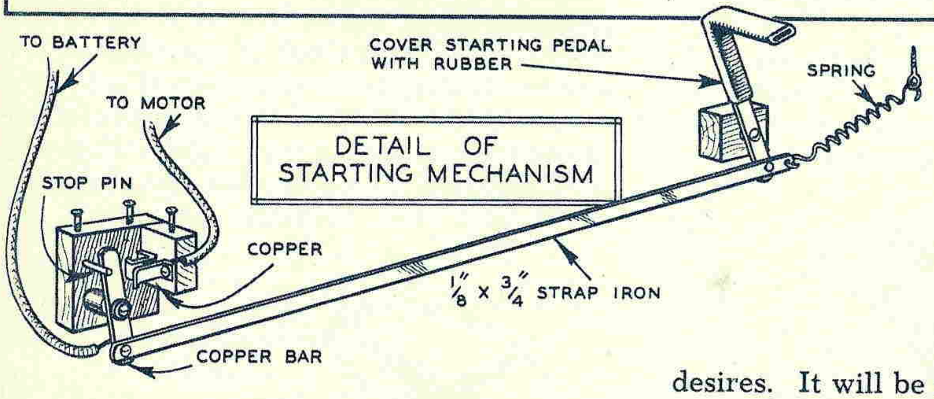

SECTION
6" WHEEL
½" STEEL AXLE


BATTERY
FOOT REST
MOTOR
7"
STARTING MECHANISM (SEE DETAIL)
SIDE VIEW
32"

A perspective view of the sidewalk tractor's construction is shown above. The power drive is supplied through a power tool shaft and vee pulleys. Pulleys are geared up to wheels through vee shaped rubber belting.







Vee pulleys for the wheel drive are attached by means of iron rings sawed from an old auto or generator housing. Starter switch details are fully described at left.

shortly after the car has been put into use.

The starting pedal extends up through the floor board from the switch extension and is formed from strap iron over which has been slipped a length of rubber tubing to provide an anti-slip surface. If a satisfactory tubing is not available friction tape can be used with equal results. The pedal is hinged to a block of wood mounted on the underside of the flooring. The block should be securely fastened in place so that constant pushing on the starting pedal will not cause it to work loose.

Only heavy automobile battery cable should be used in connecting the starter motor to the battery and switch. The amperage drain on the battery being considerably great requires the use of large diameter connecting wires or cables in order that resistance is kept at a minimum. Ordinary home appliance fixture cord should not be used under any circumstances since it will lead only to disappointing results.

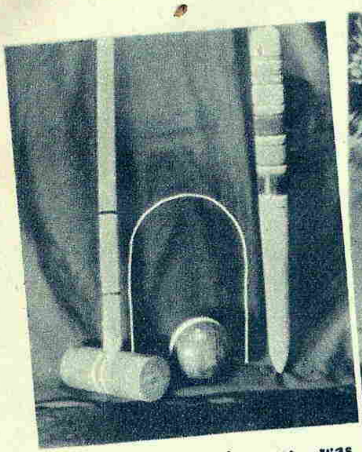
A spring attached to the foot pedal insures the circuit being open at all times. The exact spring tension can best be determined by experiment.

With the tractor car's chassis completed a suitable housing for the motor mechanism and hood can be designed and fashioned to fit the chassis to best advantage. Light sheet metal is best suited for this purpose although doped cloth can be substituted if the builder so desires. It will be noted that the sides of the rear chassis construction are of plywood tapered off into an airflow sweep so that it is only necessary to add a hinged metal top. A removable top is required so that the battery can be refilled with water and the motor brushes replaced from time to time. The motor hood can be of ultra-streamlined design and fitted with a grill to add authenticity to the car. A pair of bicycle headlights and a suitable tail light and even an electric "mike" horn can be added as accessories. All of these devices can be attached to the storage battery and will not incur excess drain if moderately used.

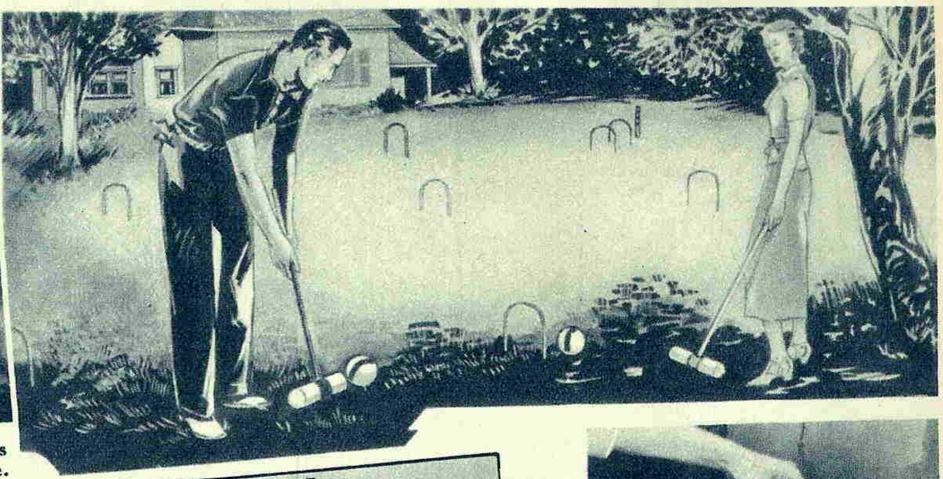
With all actual construction work completed the car is ready for painting. All wooden parts should first be sanded smooth and the grain sealed with one or two coats of shellac which in turn are rubbed down to perfect smoothness.

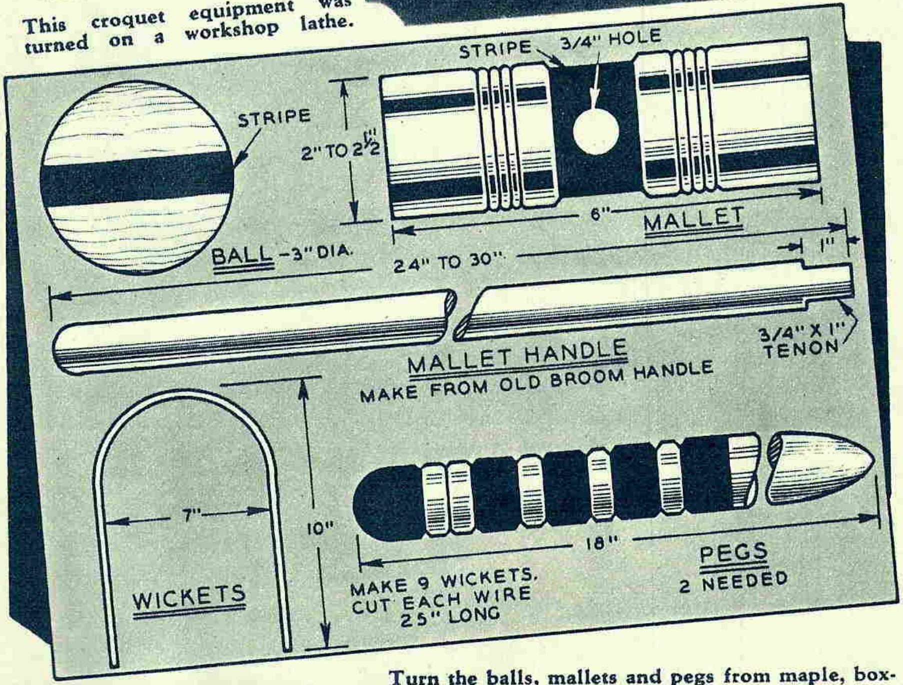
Bright colors are suggested for the color scheme in order that the car will have a professional touch. Colors such as bright red, yellow and blue with a silver trim or airstream flow are unusually attractive. Lacquer or enamel, either brushed or sprayed, can be used. If the finish is applied with a brush a good grade of enamel is recommended. The possibilities which this car presents are unlimited and with a few tools and the necessary patience any man or boy can turn out a car that will be the envy of all the children in the neighborhood.

MAKING A LATHE TURNED CROQUET SET

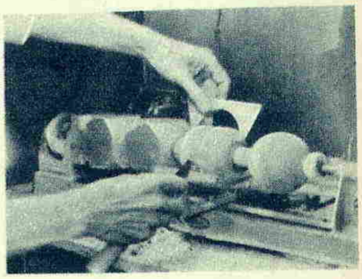


This croquet equipment was turned on a workshop lathe.

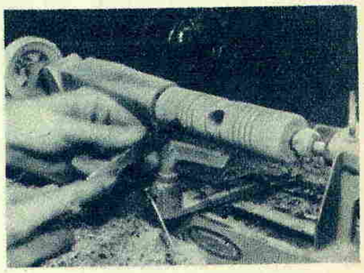




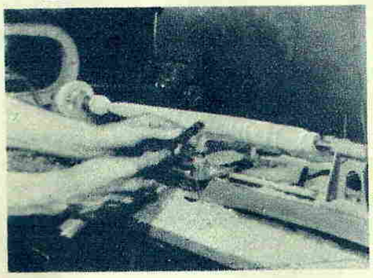
Turn the balls, mallets and pegs from maple, boxwood, beach or pine stock. The mallet handles are either lathe turned or fashioned from broomstick handles. Make wickets from heavy iron wire.



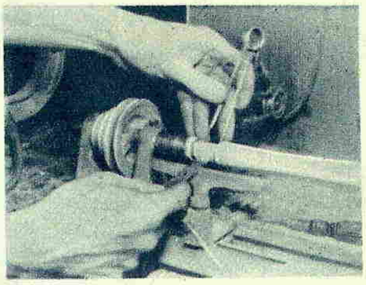
Shape the balls from a length of 4" by 4" stock. A plywood template insures perfect roundness.



This mallet head nears completion as decorative lines are applied with the point of a skew chisel.



Turn down the pegs from 1½" by 1½" maple stock. Make the decorative markings as shown, using the point of the skew.



CROQUET is a time tested game that attracts new converts each year. Extremely simple to play, it provides invigorating outdoor sport for two or more players. Materials cost is slight since most any available stock can be used for turning the mallets, balls and pegs.

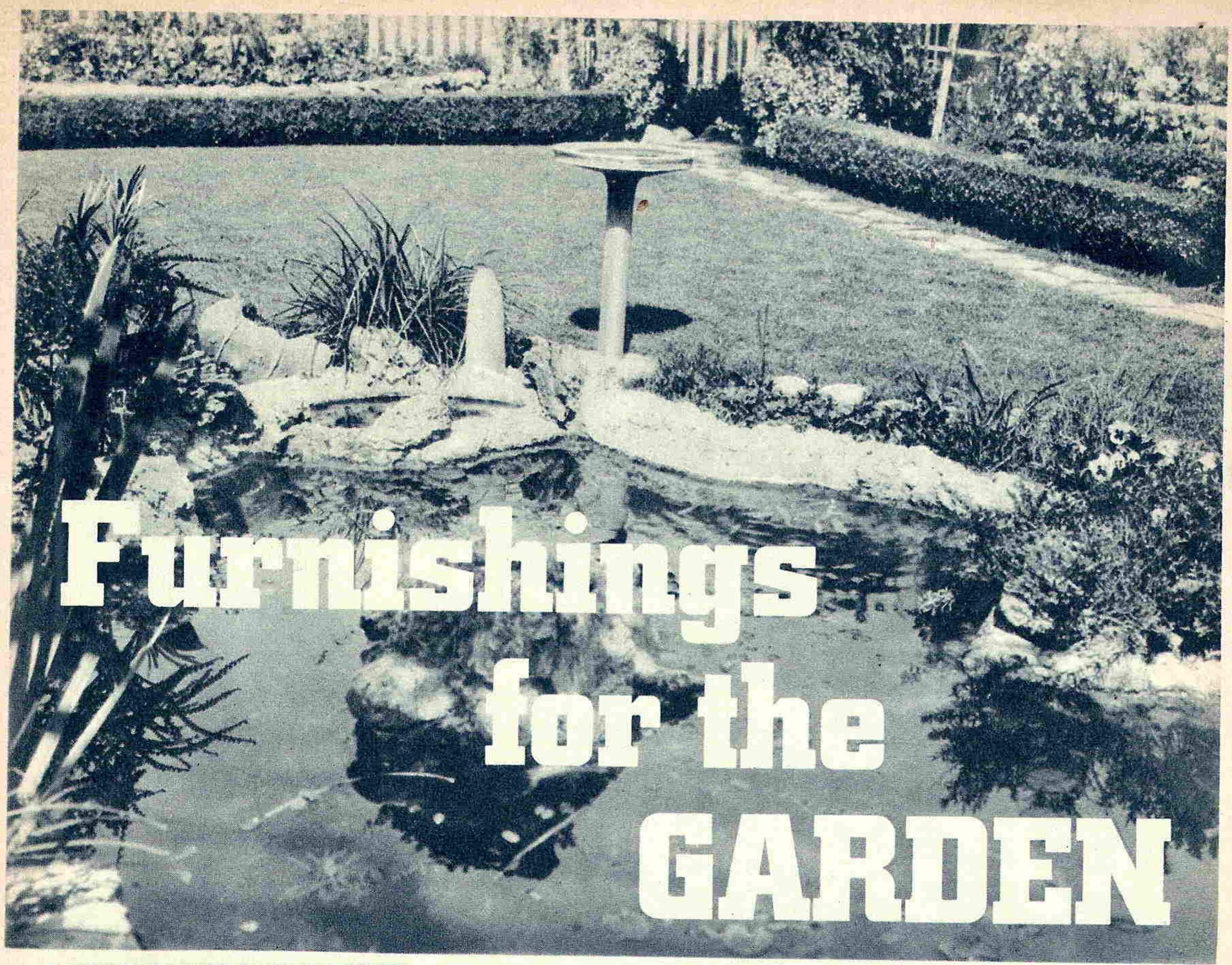
A power wood turning lathe is required to make the components for a croquet set for play on a home lawn court. The turning of these pieces is not at all difficult.

Use 2½-inch to 4-inch square boxwood, maple, beach or even fir and pine for the mallet heads and the balls. Old broomsticks make excellent handles for the mallets. The pegs may be turned from any 1½-inch square wood. The wickets are made by bending heavy wire into a U shape.

To shape the balls, cut the square stock the necessary length for the turning of four balls. Allow a full inch between balls. Mark the square into the required sections with the skew chisel, then shape these sections into rough cylinders to the diameter of the finished

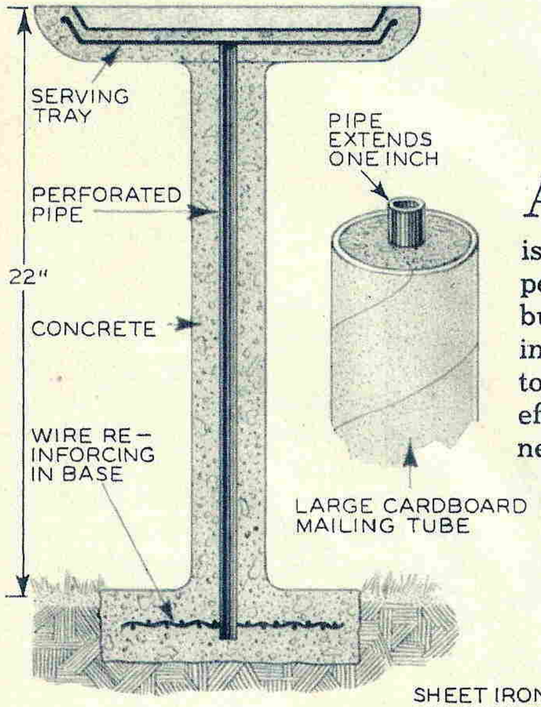
[*Continued on page* 130]

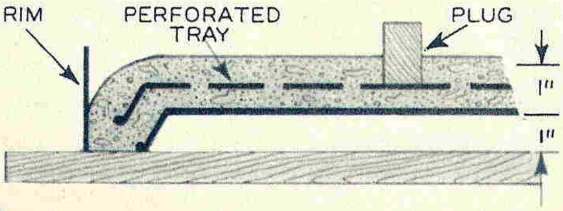
Furnishings for the GARDEN

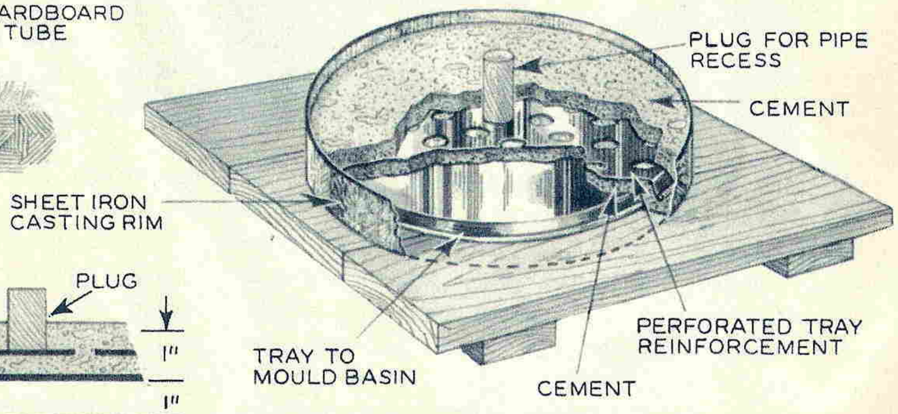


Any garden will be enhanced by this attractive concrete bird bath shown on the lawn of a Pasadena, California home. Details of the bath's construction is shown below. A cardboard mailing tube forms the cast for the pedestal while the basin is formed on a tin serving tray to provide reinforcement.

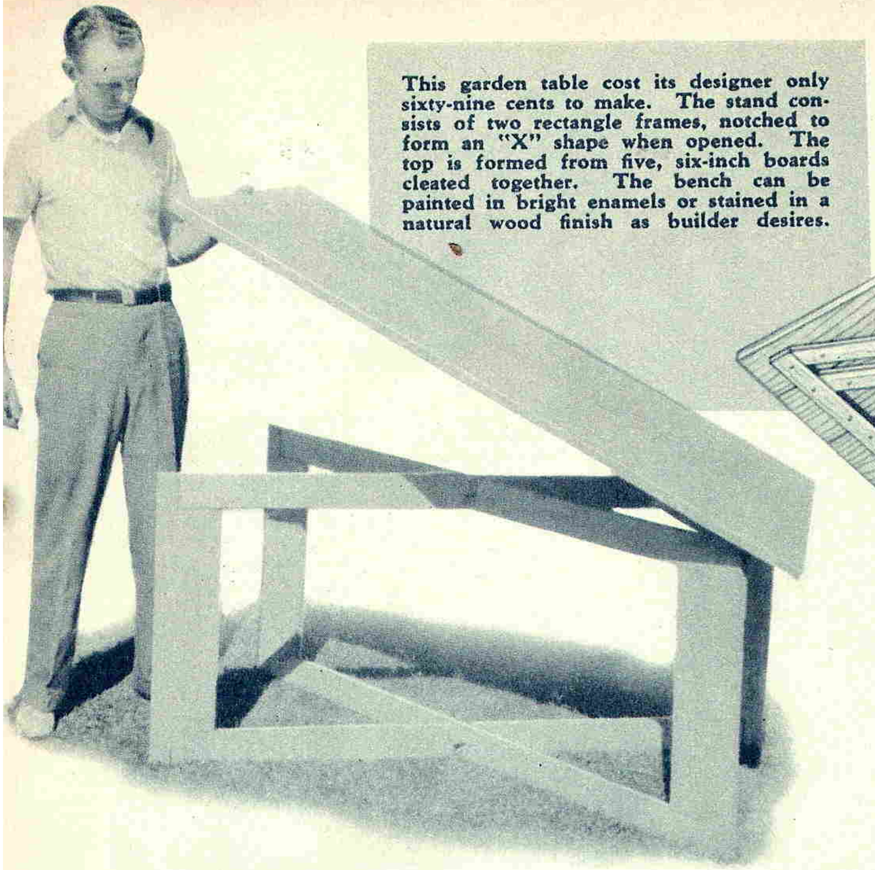
AN ATTRACTIVE garden always adds considerably to the appearance of the home, especially when it is furnished with the proper outdoor accessories. Any person with a fair knowledge of practical mechanics can build these attractive lawn furnishings without any great investment. In most instances materials cost is too slight to even give consideration. A few spare hours and a little effort will result in projects which you can display to your neighbors and friends with pride.


SERVING TRAY
PERFORATED PIPE
22"
CONCRETE
WIRE RE-INFORCING IN BASE
PIPE EXTENDS ONE INCH
LARGE CARDBOARD MAILING TUBE

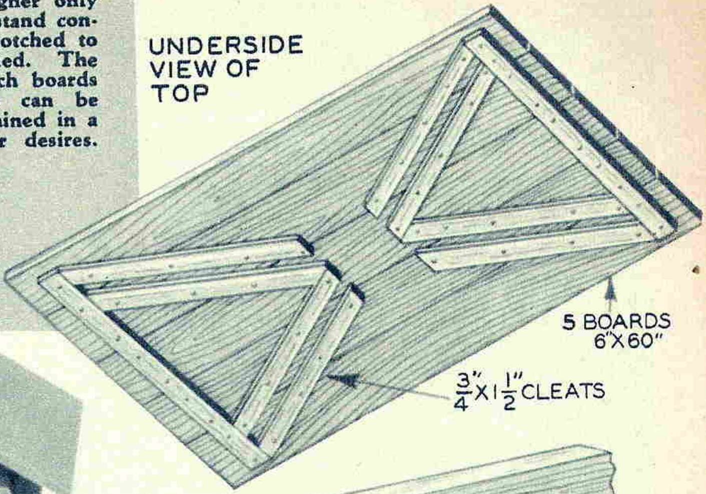

RIM
PERFORATED TRAY
PLUG
1"
1"

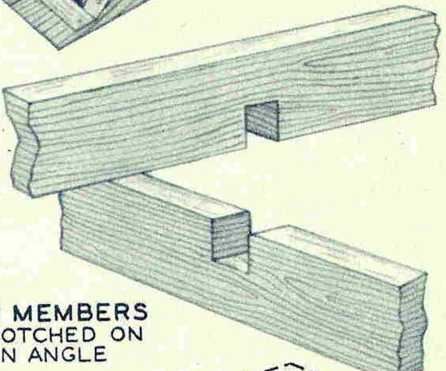

PLUG FOR PIPE RECESS
CEMENT
SHEET IRON CASTING RIM
PERFORATED TRAY REINFORCEMENT
TRAY TO MOULD BASIN
CEMENT

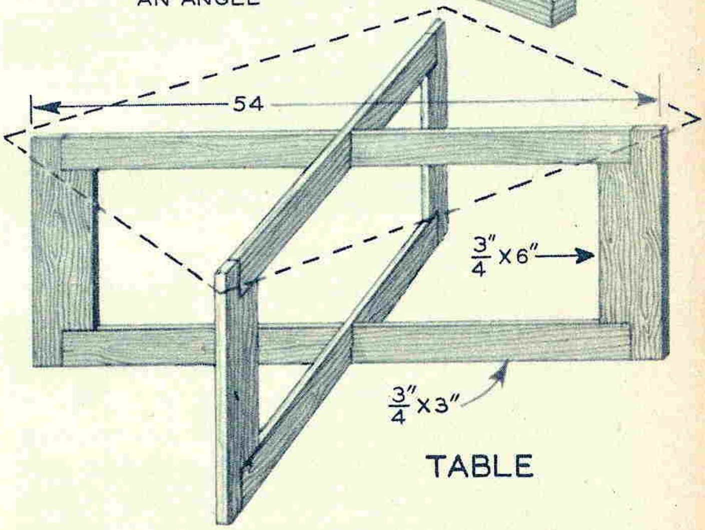
SIMPLE BIRD BATH



This garden table cost its designer only sixty-nine cents to make. The stand consists of two rectangle frames, notched to form an "X" shape when opened. The top is formed from five, six-inch boards cleated together. The bench can be painted in bright enamels or stained in a natural wood finish as builder desires.


UNDERSIDE VIEW OF TOP
5 BOARDS 6"X60"
$\frac{3}{4}$"X1$\frac{1}{2}$" CLEATS


X MEMBERS NOTCHED ON AN ANGLE

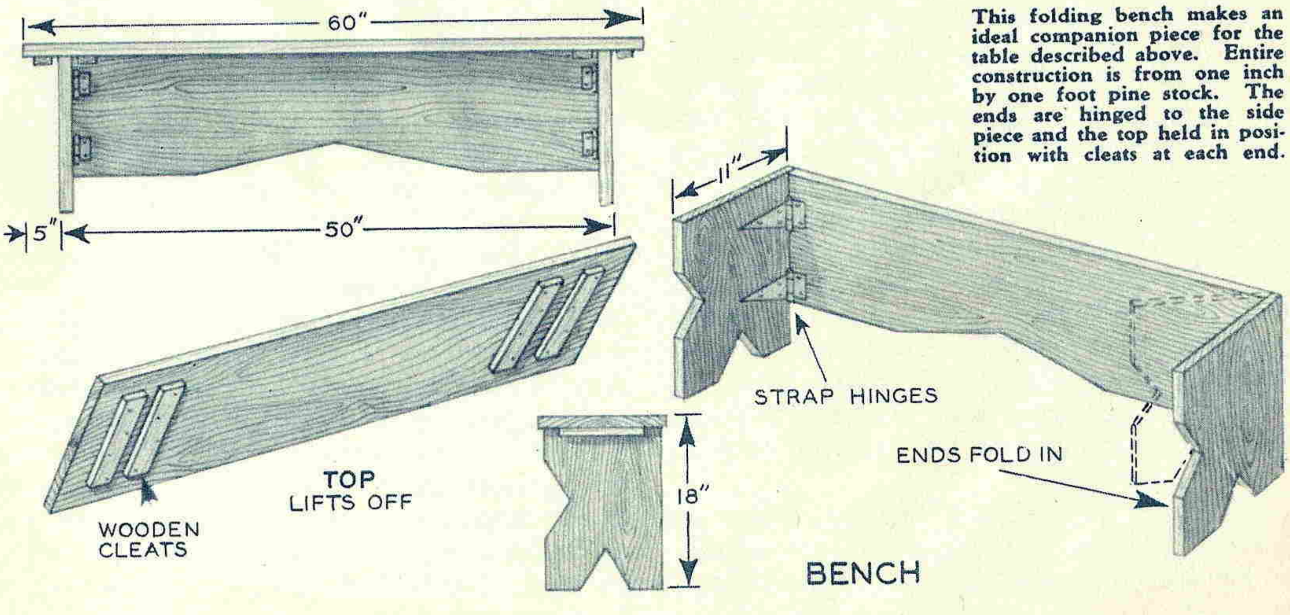

54
$\frac{3}{4}$"X6"
$\frac{3}{4}$"X3"
TABLE

A bird bath always provides unusual interest and involves no difficult construction such as the use of special moulds for casting the concrete. The bird bath pictured in the accompanying illustrations is a good example of ingenious construction. For materials, two tin serving trays, iron pipe, and a large cardboard mailing tube are the only items needed in addition to sand and cement.

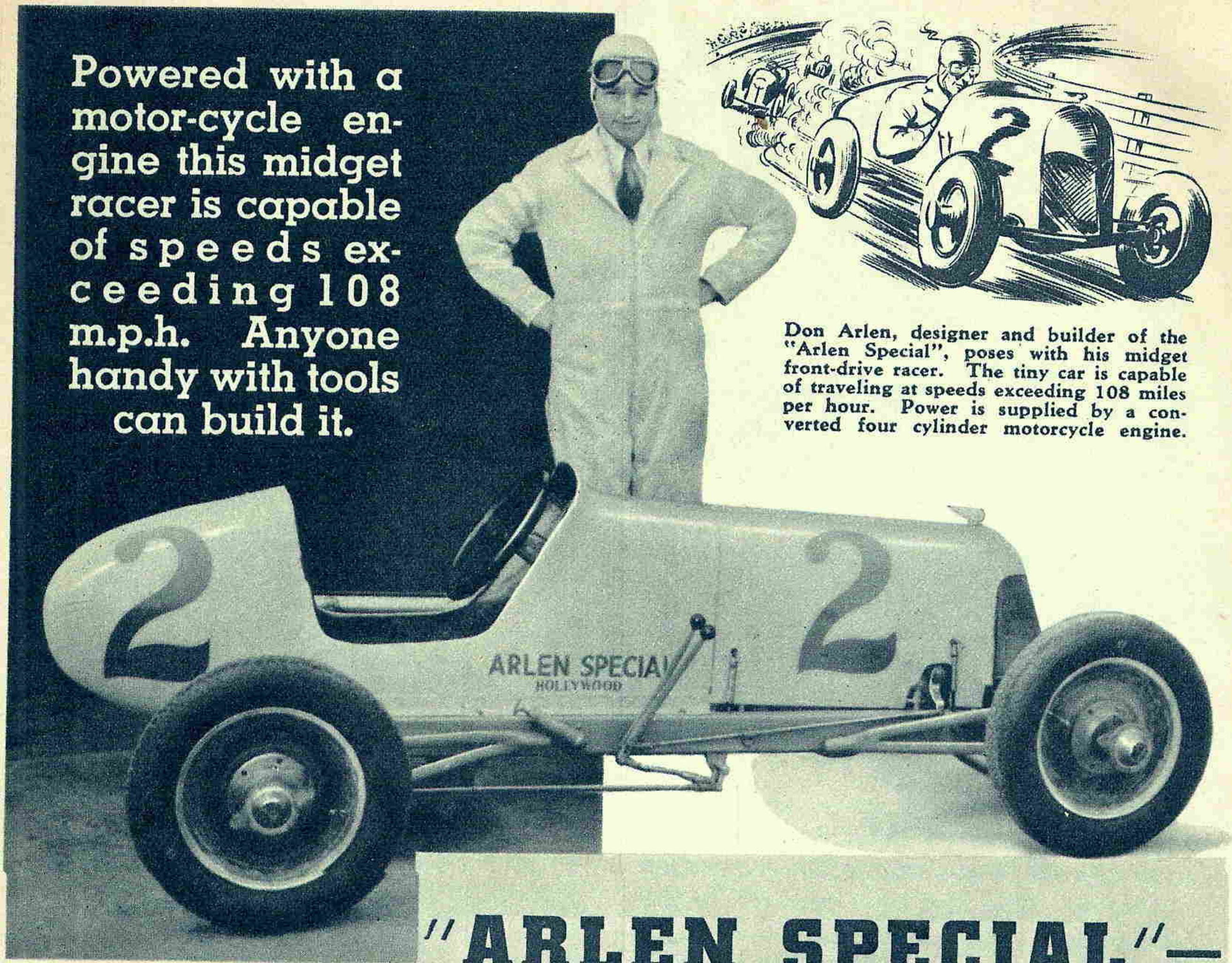
The pedestal is cast first in the following manner. Drill a length of iron pipe with numerous ½-inch holes and drive one end into the earth. Slip the cardboard mailing tube over this so that the pipe is in the exact

[*Continued on page* 128]

This folding bench makes an ideal companion piece for the table described above. Entire construction is from one inch by one foot pine stock. The ends are hinged to the side piece and the top held in position with cleats at each end.


60"
5"
50"
11"
STRAP HINGES
WOODEN CLEATS
TOP LIFTS OFF
18"
ENDS FOLD IN
BENCH

Powered with a motor-cycle engine this midget racer is capable of speeds exceeding 108 m.p.h. Anyone handy with tools can build it.



Don Arlen, designer and builder of the "Arlen Special", poses with his midget front-drive racer. The tiny car is capable of traveling at speeds exceeding 108 miles per hour. Power is supplied by a converted four cylinder motorcycle engine.

"ARLEN SPECIAL"—

by Manley Mills

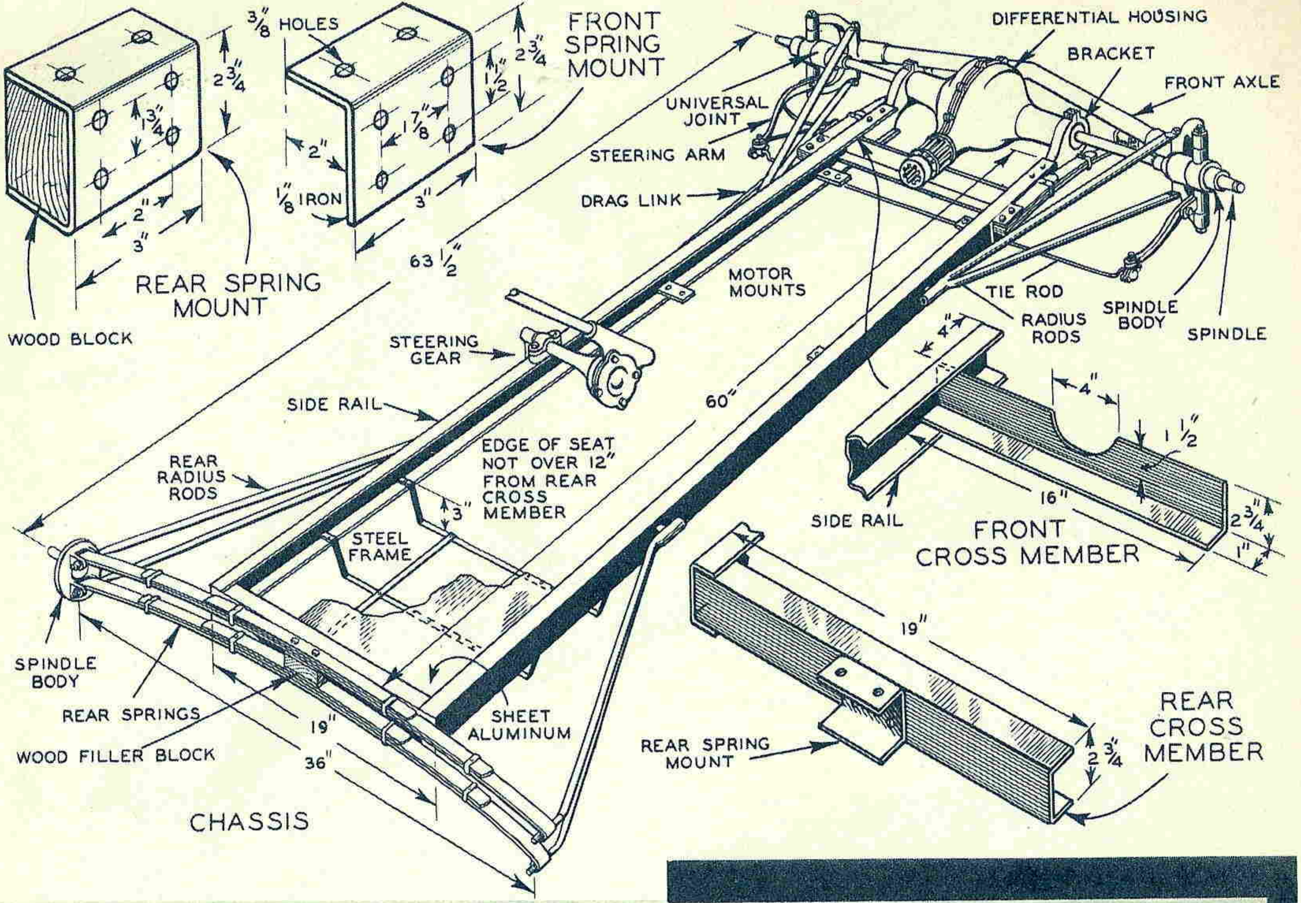
MODERN MECHANIX first aroused interest in baby automobiles when, in 1931, it sponsored a nation-wide midget car contest. Judging from the results of this contest and the hundreds of inquiries received concerning "Midget Miller" which appears in the 1936 *How To Build It,* the interest in baby cars is quite keen with enthusiasm in this hobby growing steadily. If you have been waiting for plans of a midget racing car with real *speed,* simple construction and not costing a fortune to build you will find them here.

The design has been accepted and approved by the technical committee of the A.A.A., being the only American-built car of its class with that distinction. Also, it is one of the few practical front-drive baby racers in this country; designed and built by Don Arlen, of Burbank, California, who has been building and driving midget racing cars for over 15 years.

All parts for building the car, either in finished form or rough castings, are readily obtainable, however, those who are equipped for machine work can make the parts themselves, which is not a hard job at all, or have them made at a local machine shop.

After looking over the plans and photos, the builder, no doubt, will see many ways to keep the cost of construction to a minimum. If so, good, but don't skimp on any of the parts. Remember, this is a real racing car in every sense of the word, and must be built to stand up under the terrific stresses of high speeds. Good quality materials may cost a bit more, but nothing compared with the expense of a sojourn in the hospital.

For the motor a Henderson, Harley-Davidson or Indian 4 may be used. The latter type has been used in the original car with fine results. A good second-hand motor may be bought for about fifty or seventy-five dollars, possibly less. For pleasure purposes, an Austin transmission may be installed, giving three speeds forward and one reverse. In connection with the transmission, a Harley or Indian twin, or an Austin auto motor, may be used. But with the latter, a real radiator,


3/8" HOLES
2 3/4
1 3/4"
2"
3"
WOOD BLOCK
REAR SPRING MOUNT
FRONT SPRING MOUNT
2 3/4
1 1/2
1 7/8"
2"
1/8 IRON
3"
63 1/2"
DIFFERENTIAL HOUSING
BRACKET
FRONT AXLE
UNIVERSAL JOINT
STEERING ARM
DRAG LINK
MOTOR MOUNTS
TIE ROD
RADIUS RODS
SPINDLE BODY
SPINDLE
STEERING GEAR
SIDE RAIL
60"
4"
4"
1 1/2
16"
2 3/4
1"
SIDE RAIL
FRONT CROSS MEMBER
REAR RADIUS RODS
EDGE OF SEAT NOT OVER 12" FROM REAR CROSS MEMBER
3"
STEEL FRAME
19"
SPINDLE BODY
REAR SPRINGS
19"
WOOD FILLER BLOCK
36"
SHEET ALUMINUM
REAR SPRING MOUNT
2 3/4
REAR CROSS MEMBER
CHASSIS

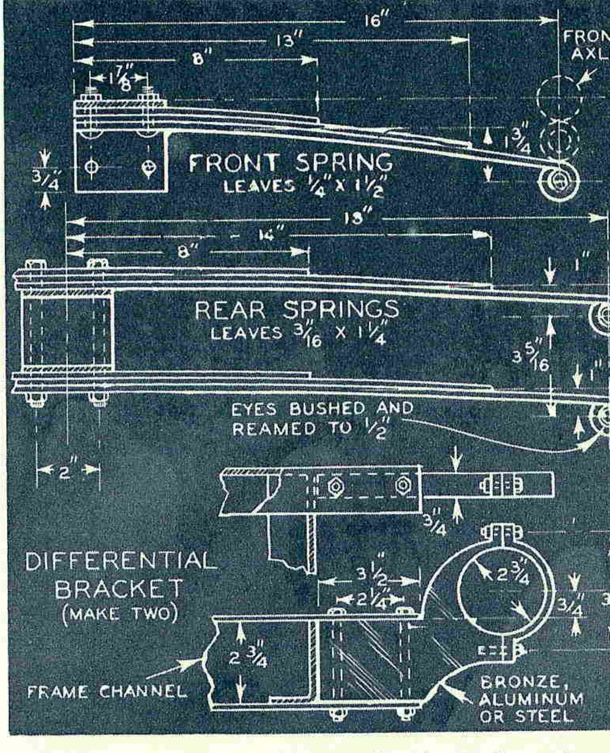
A MIDGET FRONT-DRIVE RACER

instead of a dummy, is necessary and that complicates matters.

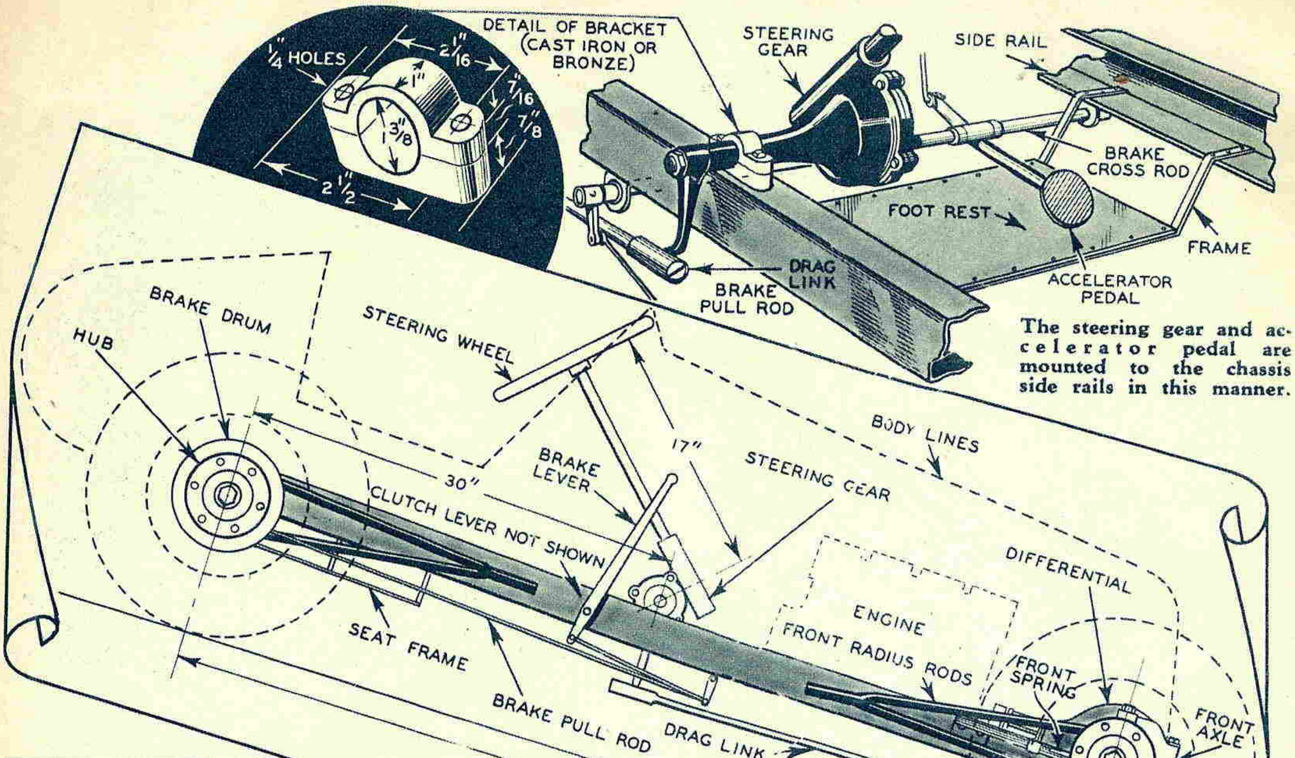
For racing, a transmission is neither necessary or desirable, for the car will go faster without one. Though, of course, it will have to be towed around everywhere off the race track, and will have to be pushed to crank it. However, you might hook up an electric starter by means of a chain drive if desired.

How's this for speed? It has reached over 120 miles an hour for short distances, and has been clocked electrically at 108.39 miles an hour over a distance of one mile! And the car is so small, it seems to be going about twice as fast as it really is. With a transmission, which is necessary if you drive on the highways, it will zoom along at 85 miles an hour, or faster if the motor is tuned up well.

Weighing just 450 pounds, it is designed so that all weights are properly distributed to give it correct balance. Otherwise, it would almost be suicide to drive such a light car at top speed.

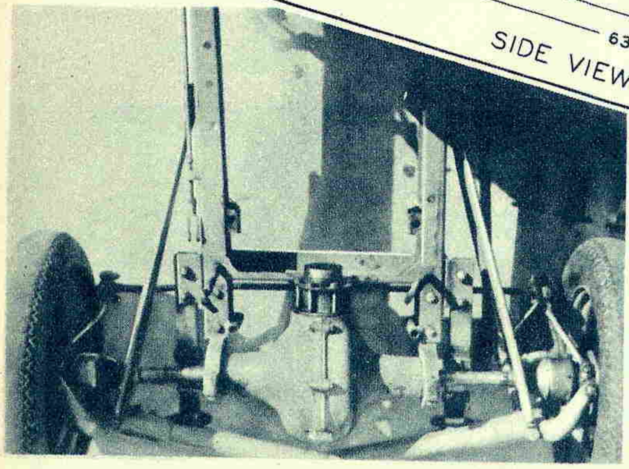

16"
13"
8"
FRONT AXLE
1 7/8"
1 3/4
3/4
FRONT SPRING
LEAVES 1/4" X 1 1/2"
18"
14"
8"
1"
REAR SPRINGS
LEAVES 3/16 X 1 1/4
3 5/16
1"
EYES BUSHED AND REAMED TO 1/2"
2"
3/4
DIFFERENTIAL BRACKET
(MAKE TWO)
3 1/2"
2 1/4"
2 3/4
3/4
3 3/4
2 3/4
FRAME CHANNEL
BRONZE, ALUMINUM OR STEEL

The method of assembling the chassis frame is shown in the upper illustration. Directly above is shown the front and rear spring details and their dimensions. Exercise care in this construction.


DETAIL OF BRACKET (CAST IRON OR BRONZE)
1/4" HOLES
2 1/16"
1"
7/16"
7/8"
1 3/8"
2 1/2"
STEERING GEAR
SIDE RAIL
BRAKE CROSS ROD
FOOT REST
FRAME
DRAG LINK
BRAKE PULL ROD
ACCELERATOR PEDAL
BRAKE DRUM
HUB
STEERING WHEEL
BODY LINES
17"
STEERING GEAR
BRAKE LEVER
30"
CLUTCH LEVER NOT SHOWN
DIFFERENTIAL
ENGINE
FRONT RADIUS RODS
FRONT SPRING
FRONT AXLE
SEAT FRAME
BRAKE PULL ROD
DRAG LINK
TIE ROD
STEERING ARM
63 1/2"
SIDE VIEW OF CHASSIS
FRONT SPRING SHACKLE

The steering gear and accelerator pedal are mounted to the chassis side rails in this manner.

This side view of the "Arlen Special" shows the general assembly arrangement. The body is designed and installed only after the chassis has been completed and motor installed.



Here is the Model A differential installed in the front end of the "Arlen Special" chassis. Brackets attached to the chassis frame hold the unit rigid. Note how the radius rods hold the front steering axle assembly rigid.

The front-drive arrangement is almost a necessity for such a light car, especially at high speeds. In fact, a rear-drive car of comparable weight would undoubtedly "swap ends" on a turn and take-off for the high places. A front-drive type can come out of a turn a lot faster, too. Another thing. Notice that the seat is 3 inches below the frame, so that you sit well down in the car. This would be impractical in a rear-drive car of this size, for the propeller shaft would be in the way. Another point in favor of the front-drive is that the center of gravity is lowered.

Note, in the plans, the unique rear-end construction. There is no rear axle in the true sense, the spindle bodies of the wheels being carried on the ends of two transverse springs mounted one above the other, radius rods maintaining alignment. This feature is regarded as good engineering practice by auto designers since it permits a maximum of "sprung weight" and affords a large degree of flexibility. A new development, this construction is superior to the old tubular axle, and even simpler.

The plans show all essential details, so that anyone interested in building this job will probably know enough about automobile construction to do an intelligent piece of work, but all complicated steps will be explained as clearly as possible.

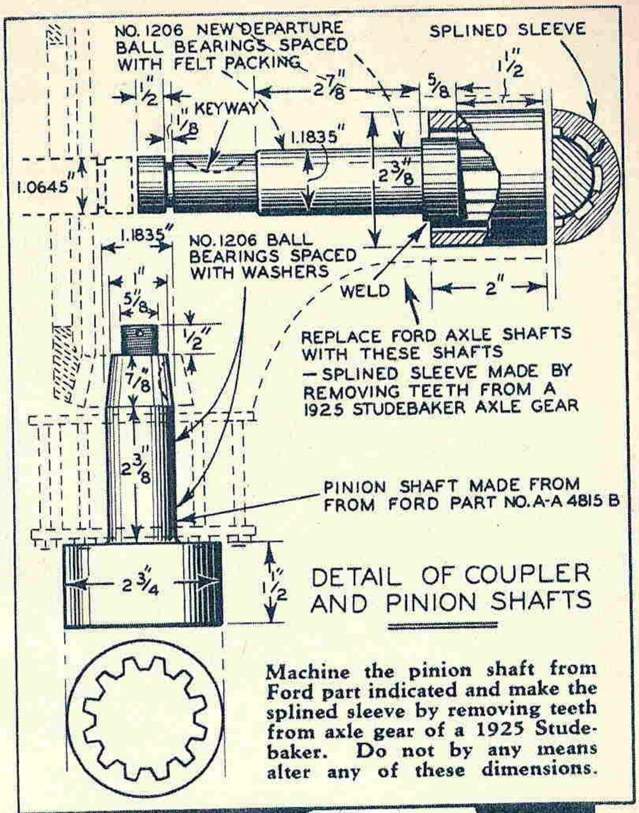
Make the frame first. The side rails and cross-members are bent from 1/8" flat iron. Side rails are 60" long, 6" wide in the unbent form, bent to a channel shape 3" deep and 1½" wide. The front cross-member has a semi-circle 4" wide and 1½" deep cut in the center of the vertical part to provide clearance for the propeller shaft bearing collar on the differential. Place the rear cross-member flush with the rear ends of the side rails, with the flanges to the front. Locate the front member 4″ from the front ends of the side rails, with the flange on the bottom and to the rear. Be sure they are at right-angles to the center-line of the frame, then weld them in place. Electric welding is used on all welded joints in the car.

Make the front spring mounts next, and bolt or rivet them to the side rails, 6″ from the front ends, with the flange flush with the top of the rails. The rear spring mount is channel shaped and bolted to the center of the rear cross-member with the upper flange flush with the top of the cross-member. Use 3/8″ S.A.E. bolts.

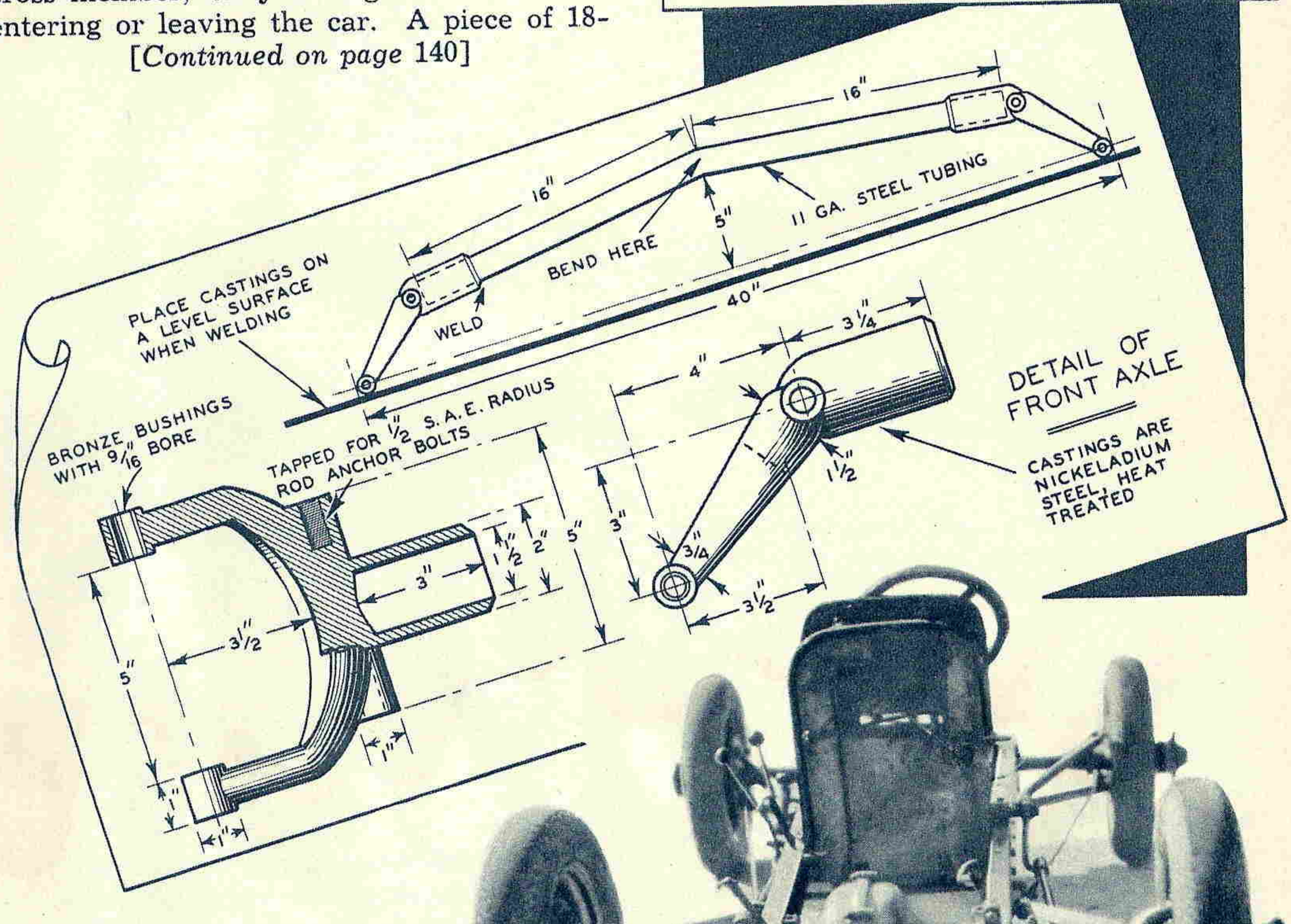
Any well-equipped sheet metal shop can supply the material and bend the above parts to the required shapes.

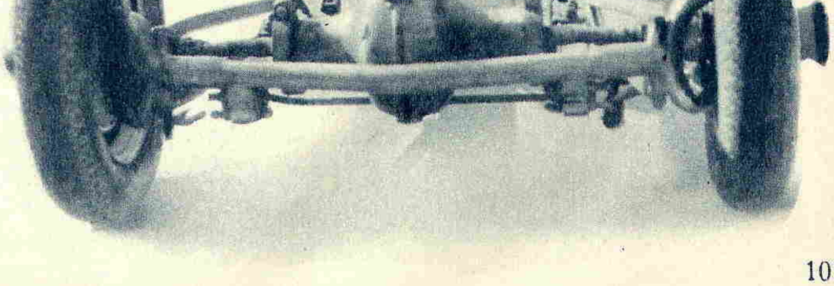
Build up the seat frame from 1/2″ wide strip steel, 16-gauge, riveted together. The cross-strips should be bent up at the ends so the seat will hang 3″ below the side rails. Don't make the front edge over 12″ from the rear cross-member, or you might have trouble entering or leaving the car. A piece of 18-

[*Continued on page* 140]


NO. 1206 NEW DEPARTURE BALL BEARINGS SPACED WITH FELT PACKING
SPLINED SLEEVE
1/2″
1/8″
KEYWAY
2 7/8″
5/8
1 1/2″
1.1835″
2 3/8″
1.0645″
1.1835″
NO. 1206 BALL BEARINGS SPACED WITH WASHERS
1″
5/8″
1/2″
7/8″
2 3/8″
WELD
2″
REPLACE FORD AXLE SHAFTS WITH THESE SHAFTS — SPLINED SLEEVE MADE BY REMOVING TEETH FROM A 1925 STUDEBAKER AXLE GEAR
PINION SHAFT MADE FROM FROM FORD PART NO. A-A 4815 B
2 3/4″
1 1/2″
DETAIL OF COUPLER AND PINION SHAFTS

Machine the pinion shaft from Ford part indicated and make the splined sleeve by removing teeth from axle gear of a 1925 Studebaker. Do not by any means alter any of these dimensions.

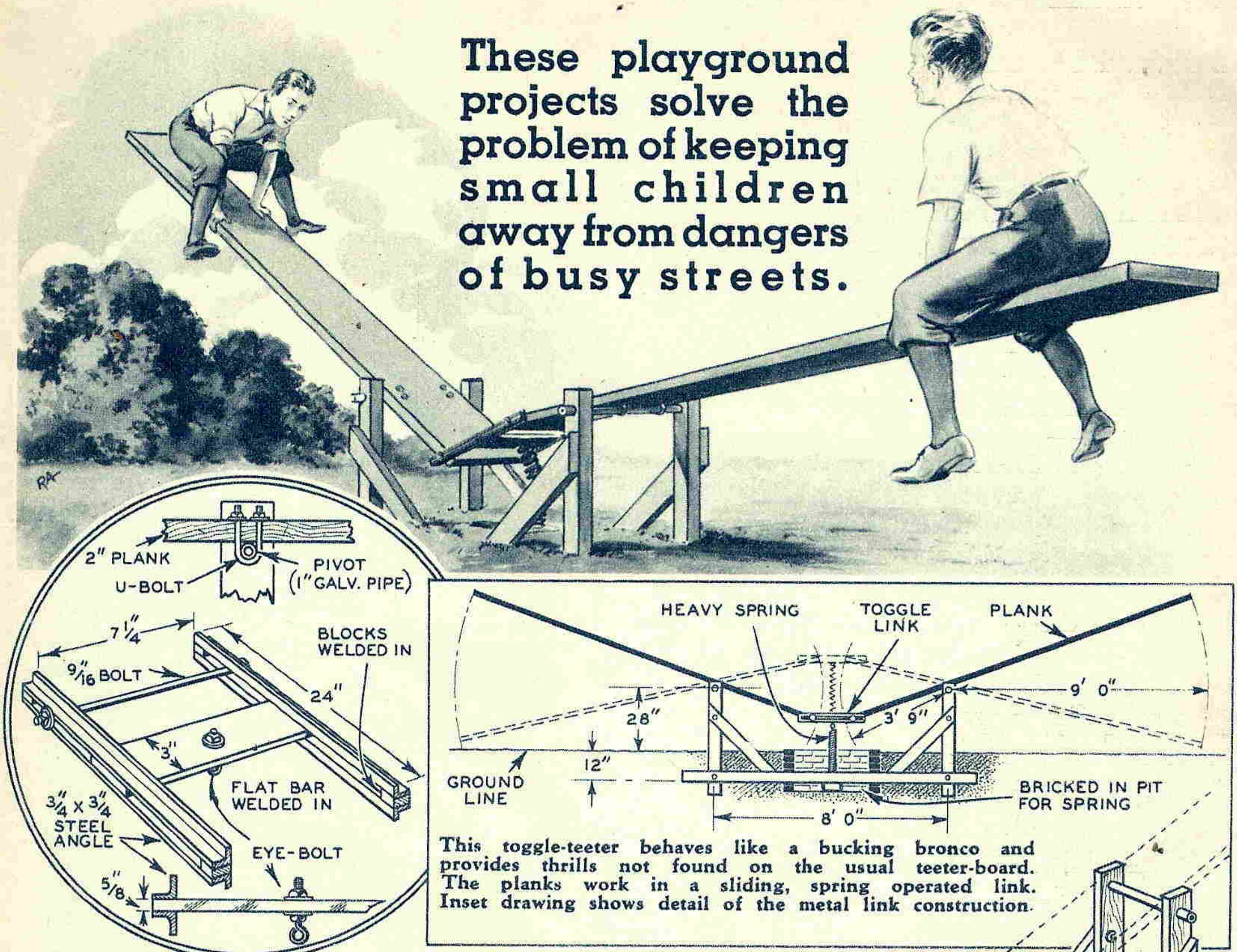

16″
16″
11 GA. STEEL TUBING
5″
BEND HERE
PLACE CASTINGS ON A LEVEL SURFACE WHEN WELDING
WELD
40″
3 1/4″
DETAIL OF FRONT AXLE
4″
S. A. E. RADIUS
BRONZE BUSHINGS WITH 9/16″ BORE
TAPPED FOR 1/2″ ROD ANCHOR BOLTS
1 1/2
CASTINGS ARE NICKELADIUM STEEL, HEAT TREATED
1 1/2″
2″
5″
3″
3″
3/4
3 1/2
3 1/2
5″
1″
1″
1″



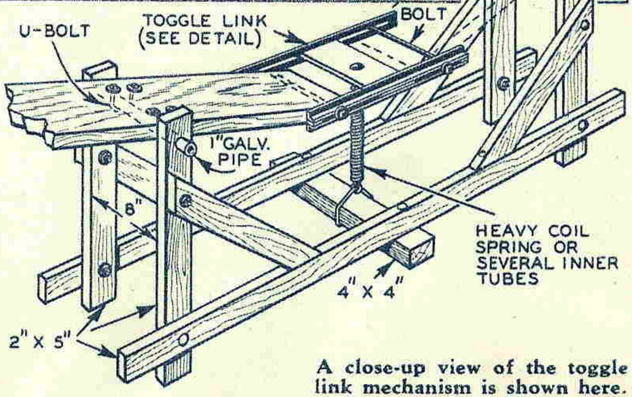
The front axle steering heads are cast from nickeladium steel, heat treated and then machined to the dimensions indicated above. In welding up the axle align it perfectly on a flat surface. At right is shown the completed chassis looking at it from the front before the motorcycle engine was installed.

BUILDING PLAY LOT EQUIPMENT

These playground projects solve the problem of keeping small children away from dangers of busy streets.


RA
2" PLANK
U-BOLT
PIVOT (1" GALV. PIPE)
7 1/4"
9/16 BOLT
BLOCKS WELDED IN
24"
3"
FLAT BAR WELDED IN
3/4 X 3/4 STEEL ANGLE
EYE-BOLT
5/8"
HEAVY SPRING
TOGGLE LINK
PLANK
28"
3' 9"
9' 0"
12"
GROUND LINE
BRICKED IN PIT FOR SPRING
8' 0"

This toggle-teeter behaves like a bucking bronco and provides thrills not found on the usual teeter-board. The planks work in a sliding, spring operated link. Inset drawing shows detail of the metal link construction.


U-BOLT
TOGGLE LINK (SEE DETAIL)
BOLT
1" GALV. PIPE
8"
HEAVY COIL SPRING OR SEVERAL INNER TUBES
4" X 4"
2" X 5"

A close-up view of the toggle link mechanism is shown here. "U" bolts hold planks to 1" pipe fulcrums. Use 2" by 5" planks teeter for the frame.

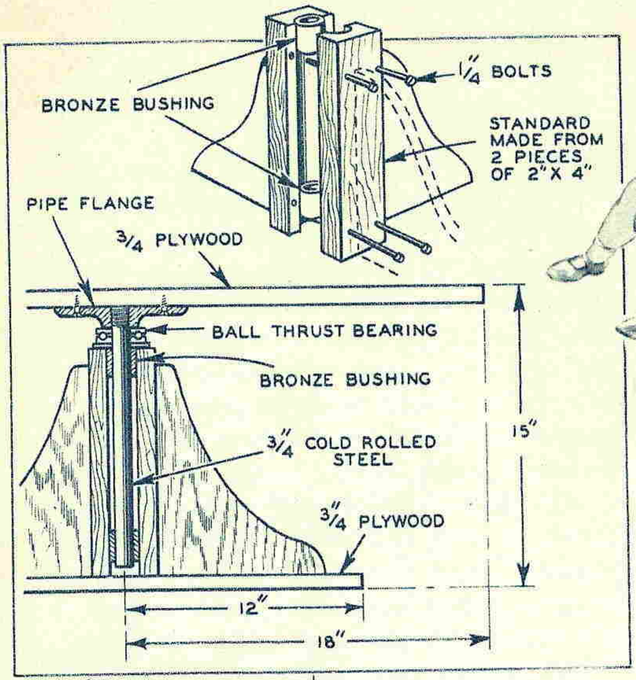
by Hi Sibley

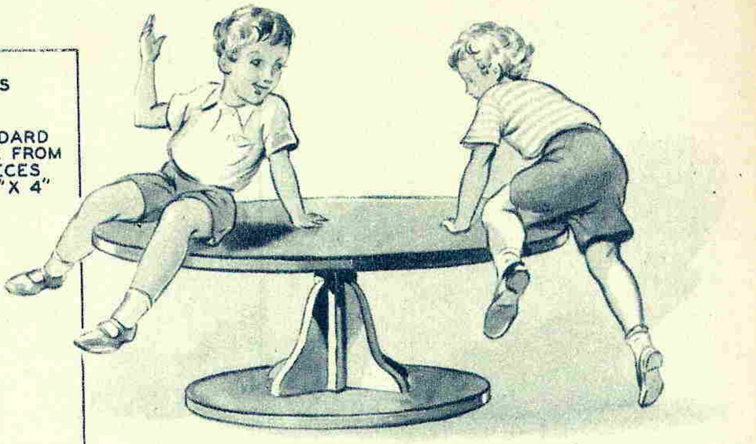
KEEPING children off dangerous streets during the summer vacation months is a difficult task unless some means can be devised whereby their attentions are centered on the home or its surroundings. One way to accomplish this is through the construction of a backyard play lot, but even then you cannot expect to hold the children's interest with merely a sandbox and a few toys. Slides and swings are part of the equipment necessary and need no explanation as to their construction. In addition one or two novel pieces of recreation equipment are recommended such as the clever "toggle-teeter" and giant "piano stool" about to be described.

The "toggle-teeter" is entirely different from the usual teeter board inasmuch as two fulcrums and a toggle link provide bucking bronco action instead of the ordinary up and down motion. A sudden lunge by one rider will cause the other to sail upward or both riders can move in the same direction by regulating their movements accordingly.

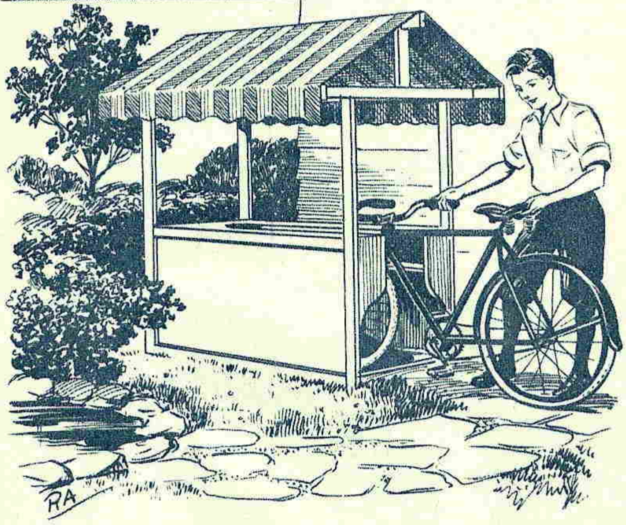
Construction of the "toggle-teeter" is not complicated in the least respect. First assemble the wooden base from 2-inch by 5-inch stock, burying the sills under the ground to provide a firm foundation. Holes are drilled in the upright members for inserting the 1-inch galvanized pipe fulcrums and the planks are

FOR THE KIDDIES' ENJOYMENT


1/4 BOLTS
BRONZE BUSHING
STANDARD MADE FROM 2 PIECES OF 2" X 4"
PIPE FLANGE
3/4 PLYWOOD
BALL THRUST BEARING
BRONZE BUSHING
3/4" COLD ROLLED STEEL
3/4" PLYWOOD
15"
12"
18"



A giant "piano stool" such as the one shown here will provide small children with endless hours of pleasure. It is merely a large wood disc 3-feet in diameter which revolves on a ball thrust-bearing as shown at left.

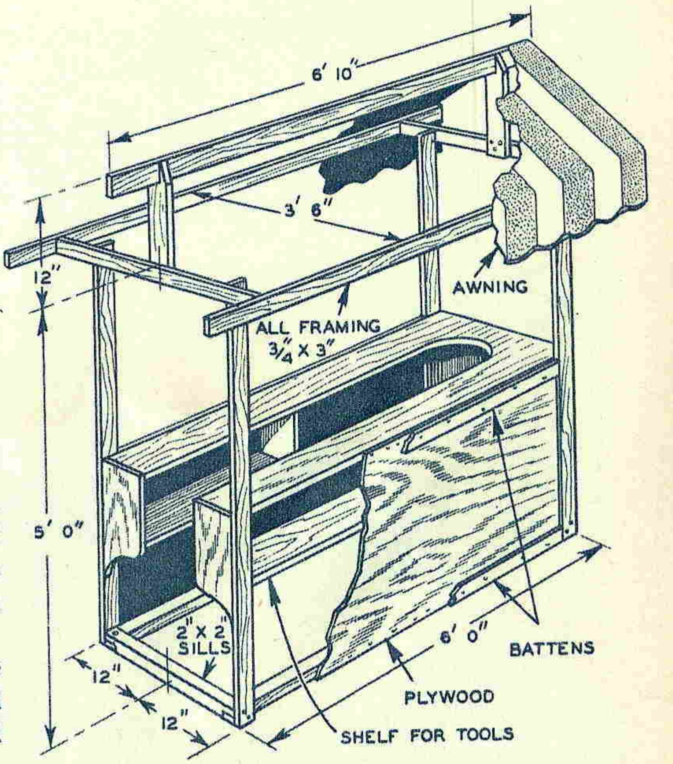


This attractive awning topped shelter provides a safe place for Junior's bicycle. The "bike" garage can be constructed in a few hours from inexpensive stock.

then clamped in position with "U" bolts. The planks each measure 12 feet, 9 inches in length and 7 inches in width. The plank stock is 2 inches thick with a hole large enough to pass the $\frac{9}{16}$ link bolt drilled in one end of each plank. The "U" bolts are inserted at a point 3 feet, 9 inches from the ends through which the link bolts will pass.

Make the toggle link from angle iron to the size and shape indicated in the link detail diagram. Spacer blocks welded in each end of the angle iron runners permit the long $\frac{9}{16}$-inch bolts to slide back and forth freely in the link so as to provide the unique teeter action. A heavy steel plate welded in the center of the angle iron runners forms an anchor for the heavy coil spring providing the teeter's momentum. The spring is drawn rigid and anchored to a 4-inch by 4-inch cross-piece under the base. If a spring of sufficient tension is not available inner tubing can be substituted with equal results.

A brick lined well directly under the center of the teeter assembly permits spring repairs or replacing of inner tubing when necessary. To protect it from the weather and add to its


6' 10"
3' 6"
12"
AWNING
ALL FRAMING 3/4" X 3"
5' 0"
2" X 2" SILLS
12"
12"
6' 0"
BATTENS
PLYWOOD
SHELF FOR TOOLS

Details of the bicycle garage construction are shown in the above perspective plan. The sides are of plywood bolted to the 3" by 5" batten frame which rests on a base formed from 2" by 2" sills. Top is awning canvas.

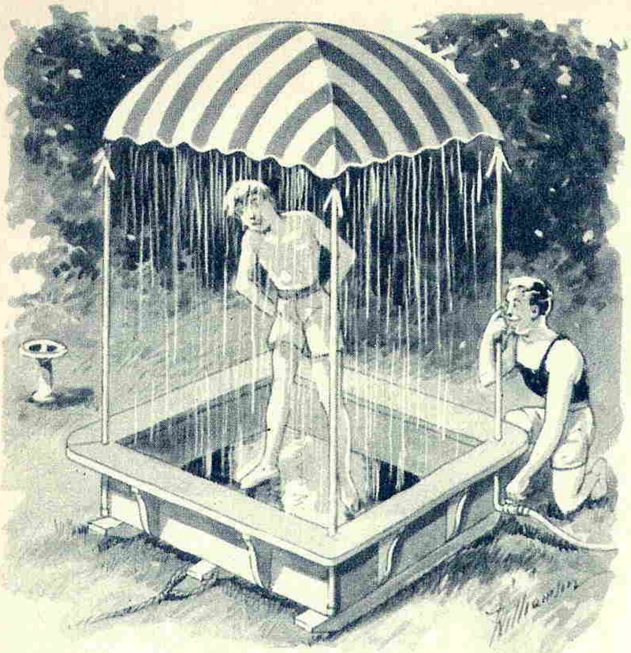
appearance the teeter should be enameled or painted in bright colors.

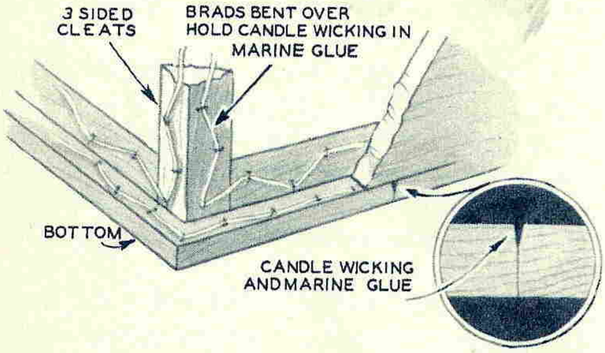
Most all small children are fascinated by revolving stools, whether in front of a piano or in a drug store, and like to climb aboard and spin around on them. A giant "piano stool" for the play lot is easy to make and will furnish the tiny tots with plenty of harmless thrills.

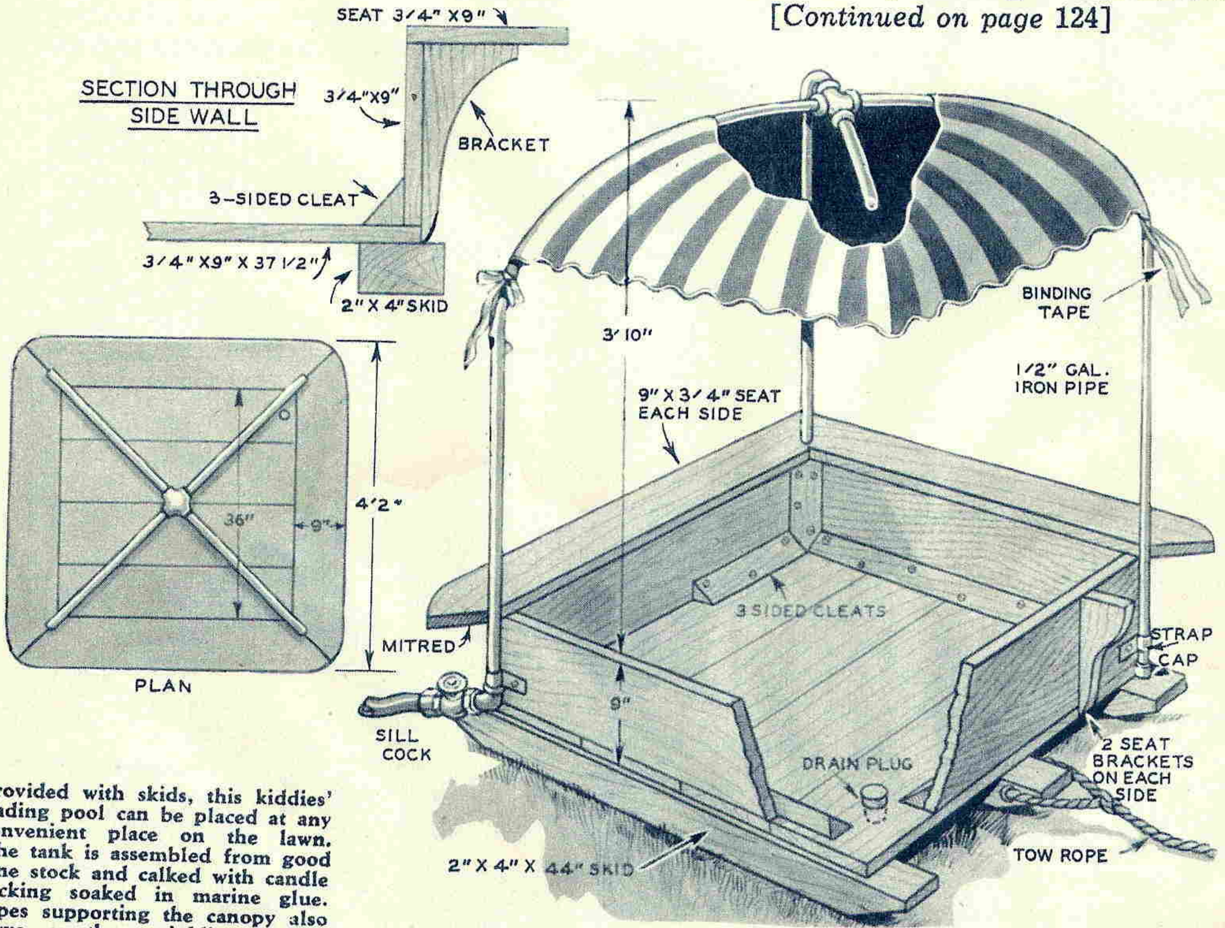
The top of the stool is a 3-foot plywood disc, ¾ inch in diameter, mounted on a steel shaft which rides in two bronze bushings. The weight is carried by a heavy-duty ball thrust-bearing which can be picked up at any auto wrecking yard. The base on which the top revolves is a simple standard built from 2-inch by 4-inch timbers grooved down the center and bolted together so as to hold the bushings rigid. Four brackets are cut from 1-inch stock and fastened to the standard and plywood base, completing the tiny merry-go-round. Sand down the edge of the disc so that no rough snags are present, then finish the stool in bright enamels.

During the past few years bicycle riding has proved to be one of the most popular sports among the older children and the increasing number of bicycles about the home premises led to many being broken by automobiles accidentally running over them when

[*Continued on page* 124]

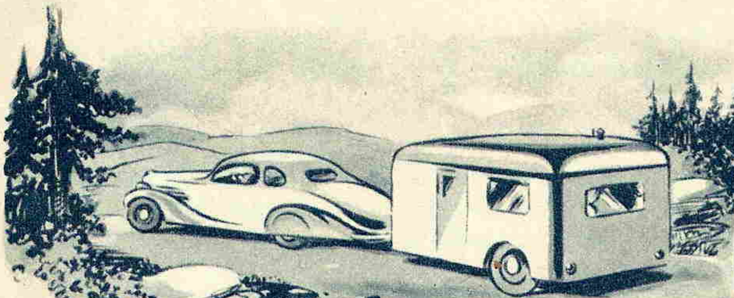


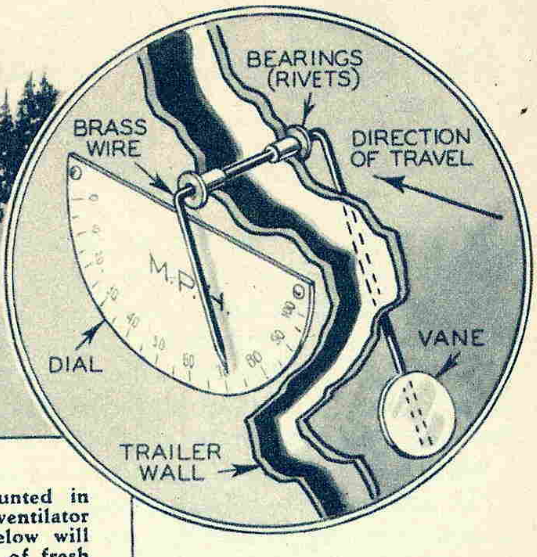

3 SIDED CLEATS
BRADS BENT OVER HOLD CANDLE WICKING IN MARINE GLUE
BOTTOM
CANDLE WICKING AND MARINE GLUE


SEAT 3/4" X 9"
SECTION THROUGH SIDE WALL
3/4" X 9"
BRACKET
3-SIDED CLEAT
3/4" X 9" X 37 1/2"
2" X 4" SKID
PLAN
36"
9"
4'2"
MITRED
SILL COCK
3' 10"
9" X 3/4" SEAT EACH SIDE
BINDING TAPE
1/2" GAL. IRON PIPE
3 SIDED CLEATS
STRAP
CAP
9"
DRAIN PLUG
2 SEAT BRACKETS ON EACH SIDE
TOW ROPE
2" X 4" X 44" SKID

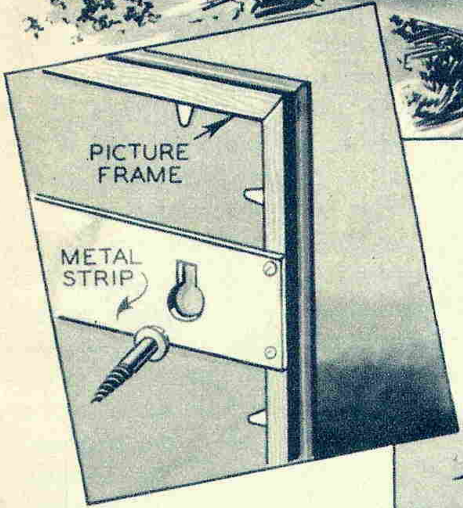
Provided with skids, this kiddies' wading pool can be placed at any convenient place on the lawn. The tank is assembled from good pine stock and calked with candle wicking soaked in marine glue. Pipes supporting the canopy also serve as the sprinkling device.

Novel Kinks For Trailer Travelers



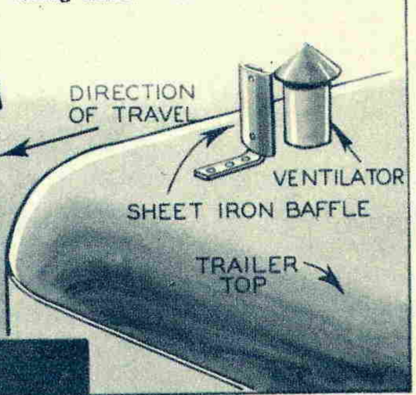

BEARINGS (RIVETS)
BRASS WIRE
DIRECTION OF TRAVEL
M.P.H.
DIAL
VANE
TRAILER WALL

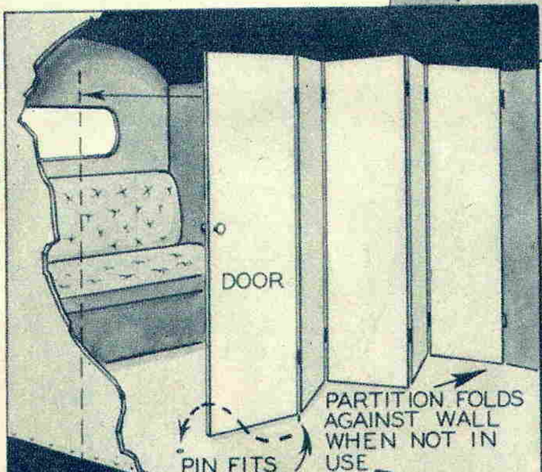
This simple velocity speed indicator can be installed in any trailer. A length of brass wire passes through grommets to a speed indicator, calibrated by experiment. A weighted vane is attached to the exposed end of the wire to insure accurate readings. Twist wire after installing so that indicator reads zero when the vane is hanging in a vertical position.


PICTURE FRAME
METAL STRIP

To prevent pictures and mirrors from being jarred from the walls of the auto trailer the simple mooring described above is suggested. Strips of metal attached across the frame as shown provide a secure mounting for these articles.

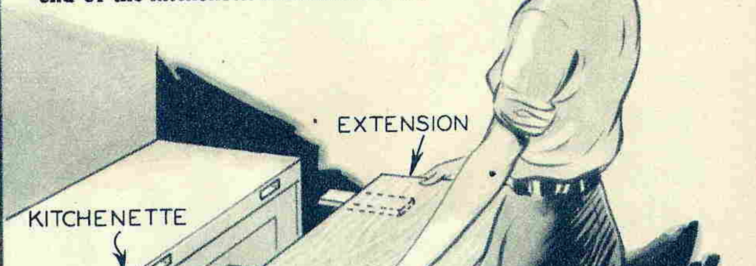
A sheet iron baffle mounted in front of the trailer's roof ventilator in the manner shown below will insure a constant amount of fresh air to enter the trailer. The baffle eliminates erratic puffs of air entering trailer when it is in motion.

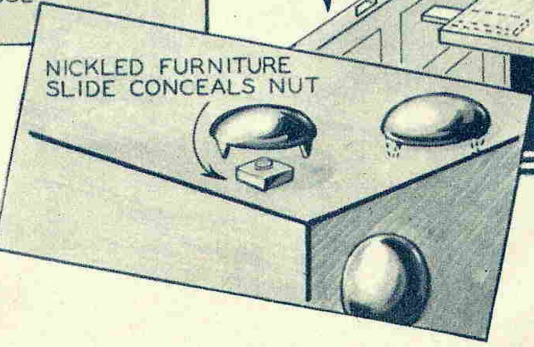

DIRECTION OF TRAVEL
VENTILATOR
SHEET IRON BAFFLE
TRAILER TOP


DOOR
PARTITION FOLDS AGAINST WALL WHEN NOT IN USE
PIN FITS IN HOLE

Instead of building a permanent partition for dining, sleeping and living quarters, the trailer can be fitted with folding screens which can be pushed back during the day. Assemble frames from 1" by ½" pine strips and cover with an attractive cloth fabric.

The trailer kitchenette can be fitted with a removable board which makes it unnecessary to open the regular table when serving small meals. The board is slipped into routed slots cut in the end of the kitchenette in manner shown.


EXTENSION
KITCHENETTE
RA


NICKLED FURNITURE SLIDE CONCEALS NUT

Where exposed bolts in trailers are noticeable they can be concealed by filing down the bolt extending beyond the nut and attaching furniture button slides over them as prescribed here.

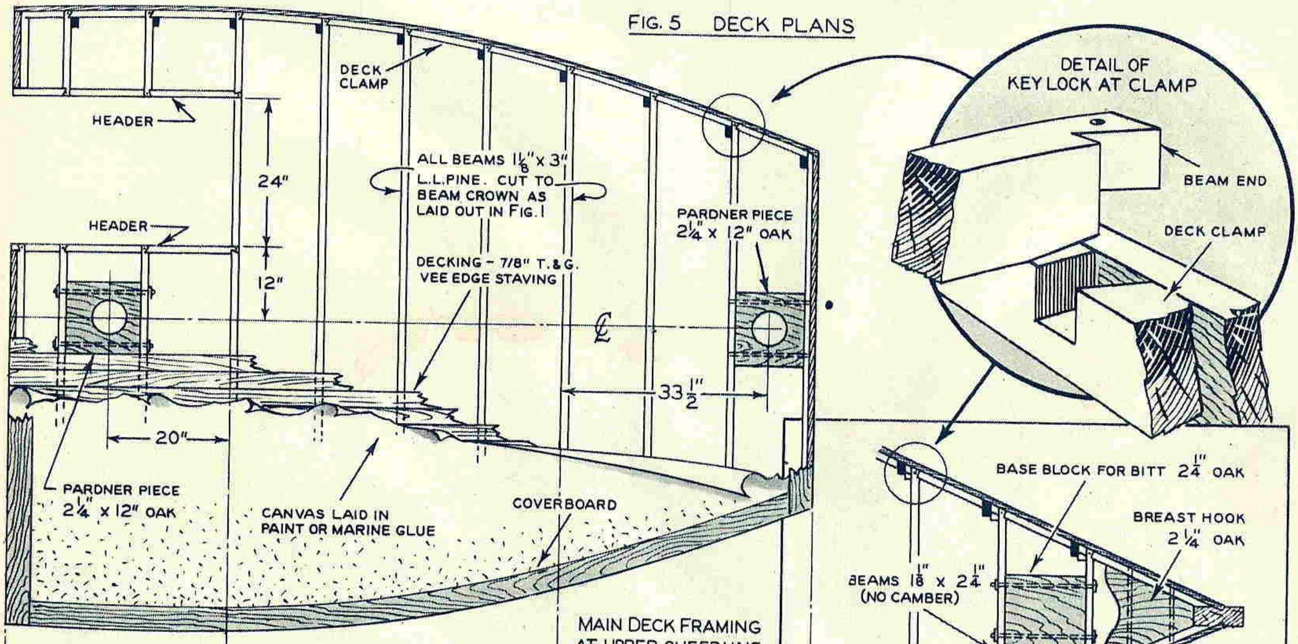
BUILDING "Flying"
A 27'-6" Auxiliary Cruiser

PART II

THE cabin interior as laid out, is one which has given much satisfaction over a period of years in all small motor boats. It is very much similar to a very popular standard small cruiser now on the market which shows tremendous sales. You may prefer another arrangement and you may suit yourself on this matter, keeping only in mind that the weights should be similarly disposed. The companionway, of which details are shown. is located on the port side. In the cabin proper the galley is located outboard of the companionway steps. Inboard of the steps the toilet bulkhead is constructed on centerline, and a small buffet covers as much of the motor as will project toward the steps. This buffet should be removable so as to get at the carburetor side of the motor. Tongue and groove ceiling three-eighths thick should be used on the toilet bulkhead, or it may be constructed of ¼" masonite as will be explained later. The galley panels are also constructed of masonite or waterproof plywood as shown. The toilet door panels should be pierced with a jigsawed design of some sort to allow air to enter the toilet at all times.

The toilet is a small marine bowl of the pump type and should be installed with the proper seacocks on intake and outlet with strainer intake to prevent clogging. Lead pipe should be used for all connections. While it will be impossible to stand upright in the toilet, it is still possible to install a wash basin should the builder desire one. This should be of the folding type, and located on the forward bulkhead in such a position that it may be used when the bowl is used as a seat. The generator side of the motor is exposed in the toilet allowing free examination of all the many parts located on this side of the motor. The toilet should be provided with a port light facing the cockpit for ventilation, and this port of course should be fitted with a curtain. Should the builder desire, a vent can be fitted through the cabin top to aid in venting the toilet, but this will form a stumbling block in going forward on

FIG. 5 DECK PLANS


DECK CLAMP
HEADER
HEADER
24"
12"
ALL BEAMS 1⅛" x 3" L.L.PINE. CUT TO BEAM CROWN AS LAID OUT IN FIG. 1
DECKING - 7/8" T.&G. VEE EDGE STAVING
PARDNER PIECE 2¼" x 12" OAK
℄
33½"
20"
PARDNER PIECE 2¼" x 12" OAK
CANVAS LAID IN PAINT OR MARINE GLUE
COVERBOARD
MAIN DECK FRAMING AT UPPER SHEERLINE
3
4
3'-0"
4'-6"
3'-5"
DETAIL OF KEY LOCK AT CLAMP
BEAM END
DECK CLAMP
BASE BLOCK FOR BITT 2¼" OAK
BREAST HOOK 2¼" OAK
BEAMS 1⅛" x 2¼" (NO CAMBER)
MAIN CLAMP
FWD. DECK FRAMING AT MAIN SHEER LINE

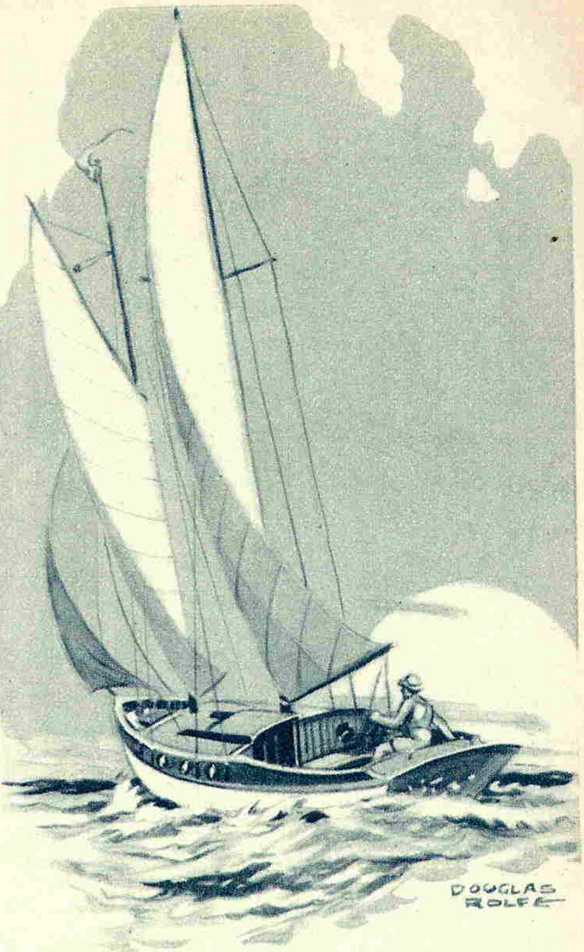
This plan shows the deck construction which was described in detail in last month's installment. At right is shown detail of the key lock at the clamp and below it the deck framing at main sheer line.

Cloud"

by Sam Rabl

Naval Architect

Designed for those of moderate means, the "Flying Cloud" affords comfortable accommodations for several adults. It features an auxiliary motor unit.



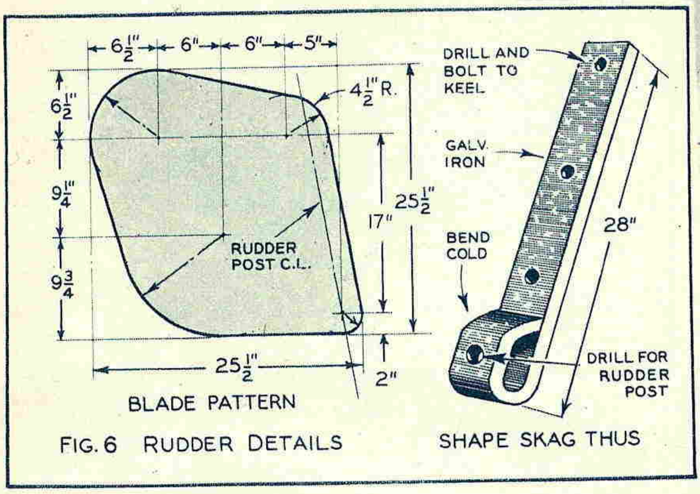


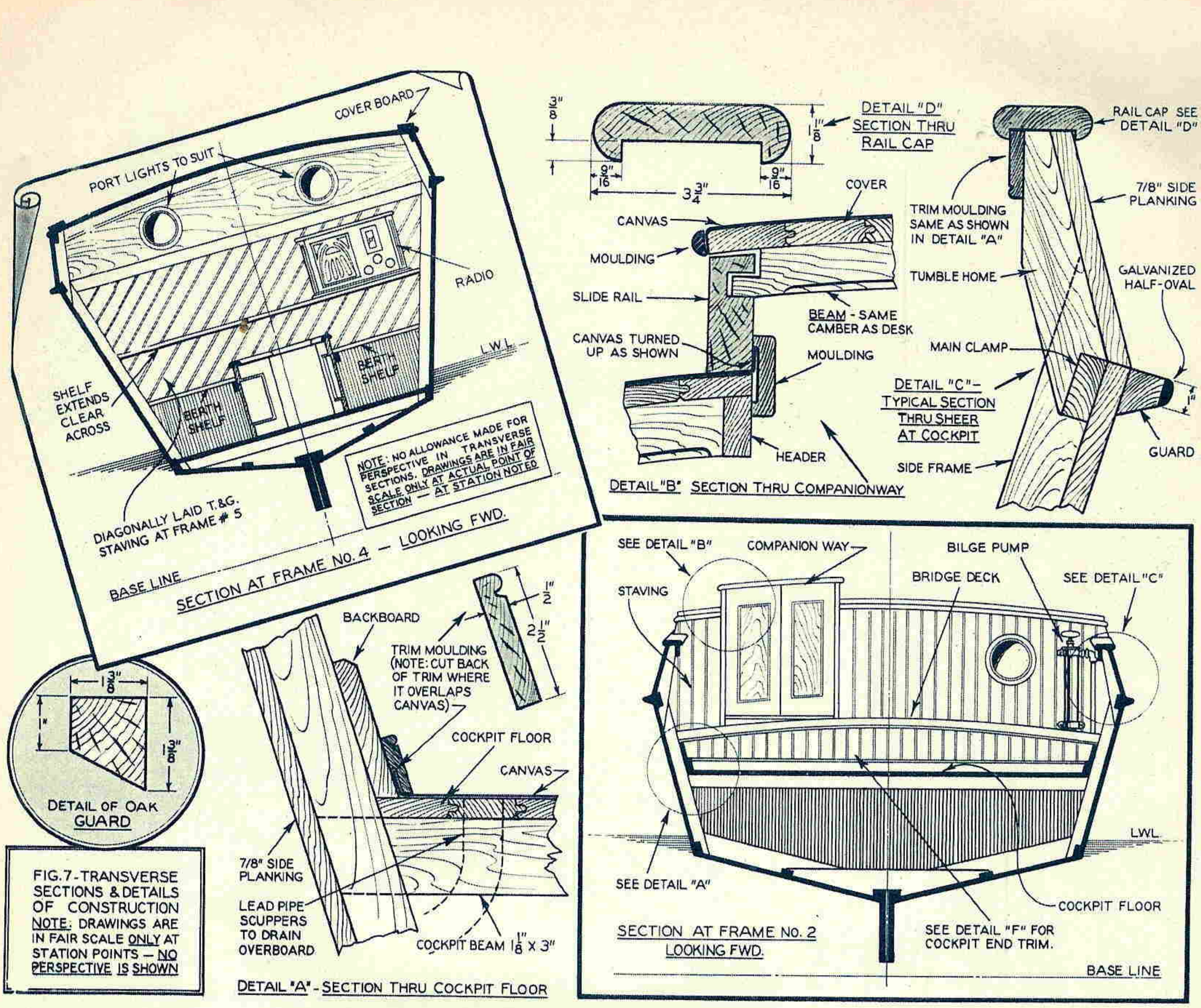
FIG. 6 RUDDER DETAILS

Here is the artist's conception of "Flying Cloud" sailing along in a spanking breeze in the rays of the setting sun. At left is shown details of the rudder and skag. Form the skag from strap iron bent cold and cut the rudder from steel or brass plate ¼-inch thick to dimensions given.

a dark night if not properly located. The interior of the toilet should be finished in white above the sheer line and a light green below.

On the forward side of the toilet bulkhead a shelf should be built to hold books and the many other what-nots that collect aboard a boat. The berths are of the conventional type and may be either fitted with plain cushions or those of the box spring type as will be dictated by the builder's pocketbook. Forward of the berths is located another shelf as shown on the plans. Stowage space is provided on the starboard side beneath the shelf. Should the builder desire, this space may be enclosed by bulkheads reaching to the deck, thus forming a locker in which shore clothes may be hung without fear of their getting mussed. The shelf forward also provides space for a radio which, if fitted, should be provided with an antenna. On station five a bulkhead is constructed extending between keel and deck and clear across the boat. A door should be provided in this bulkhead below the level of the gas tank so as to give access to the bow of the boat and the chains which will be stowed beneath the tank.

On the interior all trim may be of mahogany and varnished as here it will not be exposed to the weather. All panel work may be very easily made from masonite or plywood by simply routing a groove of the required size in the rails and stiles of the panels and setting the plywood in this groove as the panels are assembled. Panel work will be a distinctive advantage due to its ability of being easily removed for periodically painting the inside of the planking and for inspection and repair if necessary. All paneling should be installed with screws. The ceiling of the cabin should be in all cases finished a bright color to improve the lighting. The underside of the beams may be champferred or fitted with mahogany caps that can be removed when the ceiling is painted.



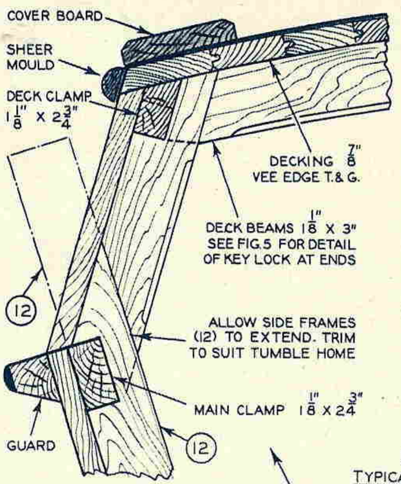
COVER BOARD
PORT LIGHTS TO SUIT
RADIO
L.W.L.
BERTH SHELF
BERTH SHELF
SHELF EXTENDS CLEAR ACROSS
DIAGONALLY LAID T.&G. STAVING AT FRAME # 5
NOTE: NO ALLOWANCE MADE FOR PERSPECTIVE IN TRANSVERSE SECTIONS. DRAWINGS ARE IN FAIR SCALE ONLY AT ACTUAL POINT OF SECTION — AT STATION NOTED
BASE LINE
SECTION AT FRAME NO. 4 — LOOKING FWD.
3/8"
1 1/8"
9/16"
9/16"
3 3/4"
DETAIL "D" SECTION THRU RAIL CAP
COVER
CANVAS
MOULDING
SLIDE RAIL
BEAM - SAME CAMBER AS DESK
CANVAS TURNED UP AS SHOWN
MOULDING
HEADER
DETAIL "B" SECTION THRU COMPANIONWAY
RAIL CAP SEE DETAIL "D"
TRIM MOULDING SAME AS SHOWN IN DETAIL "A"
7/8" SIDE PLANKING
TUMBLE HOME
GALVANIZED HALF-OVAL
MAIN CLAMP
DETAIL "C" - TYPICAL SECTION THRU SHEER AT COCKPIT
1"
GUARD
SIDE FRAME
1 3/8"
1 3/8"
DETAIL OF OAK GUARD
BACKBOARD
1/2"
2 1/2"
TRIM MOULDING (NOTE: CUT BACK OF TRIM WHERE IT OVERLAPS CANVAS)
COCKPIT FLOOR
CANVAS
7/8" SIDE PLANKING
LEAD PIPE SCUPPERS TO DRAIN OVERBOARD
COCKPIT BEAM 1 1/8" X 3"
DETAIL "A" - SECTION THRU COCKPIT FLOOR
SEE DETAIL "B"
COMPANION WAY
BILGE PUMP
STAVING
BRIDGE DECK
SEE DETAIL "C"
LWL
SEE DETAIL "A"
COCKPIT FLOOR
SEE DETAIL "F" FOR COCKPIT END TRIM.
SECTION AT FRAME NO. 2 LOOKING FWD.
BASE LINE

FIG. 7-TRANSVERSE SECTIONS & DETAILS OF CONSTRUCTION NOTE: DRAWINGS ARE IN FAIR SCALE ONLY AT STATION POINTS — NO PERSPECTIVE IS SHOWN

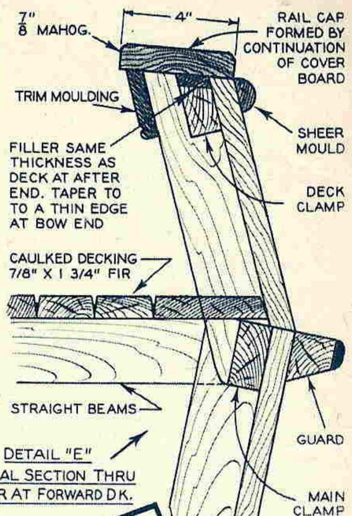
A cross-sectional view of Frame 4 looking forward is shown at top left with the cross-section of Frame 2 shown at lower right. Details A and B show cross-section through cockpit and companionway. Drawings are in fair scale at station points.

The flooring of the cabin should have a removable section so that the bilges may be inspected and painted. Linoleum on the floor will be a big aid to keeping the cabin clean, and curtains at the ports will give the interior a homey appearance. The drainboard and sink may be of monel metal or galvanized iron but in either case it should be neatly applied and all joints made watertight. A small galley pump should be fitted at the sink to draw fresh water from tanks located under the cockpit floor. A small spirit stove or one using canned heat is located aft of the sink. A dish rack is built on the aft cabin bulkhead to carry the ship's crockery. Beneath the galley platform there will be room for cupboards to stow canned goods, and should the builder desire, there will still be room to install a small icebox. All loose cushions should be of the life preserver type to avoid carrying these very necessary adjuncts as required by law. I would strongly recommend a two and a half gallon fire extinguisher of the foam type be installed rather than the ordinary one-quart liquid type. Many a beautiful cruiser has burned to the water's edge because a quart of liquid was just a little shy of being able to quell a fire.

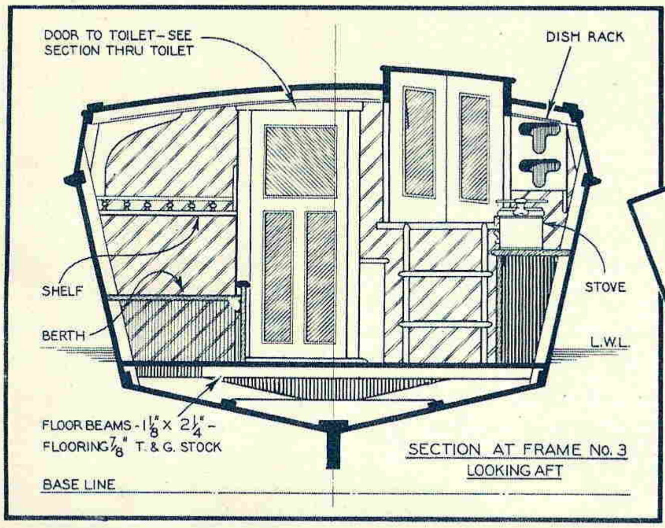
A bell and whistle are also required by law as well as sailing lights which will consist of a red light to port and a green light to starboard. A bow light must be fitted between the skeen chocks and a stern light high enough to show over all other sailing lights on the boat will be fitted aft. All of these lights should be combination oil and electric. When proceeding under sail alone only the red and green lights should show. When under sail and power a boat is considered a power boat and as such must carry all lights listed before. The cabin lights should be of the dome type and all lights must be double contact as there is no convenient steel chassis to ground to as in a car. All wiring should be installed in neat moulding so as to be readily accessible in case of short circuit. The cabin dome lights may be of the regulation auto type which are just as good as most marine lights and cost about half as much. Outlets for the sailing lights should be made through watertight fittings sold for this purpose. While on the subject of lights, an old auto headlight may be installed on the spreaders aft to form an efficient flood light to light up the deck when going aboard at night or when an emegency arises to give proper light to work the boat. This light will also be found handy for night fishing where a landing net might be required. All wires should be of the lead covered waterproof type.

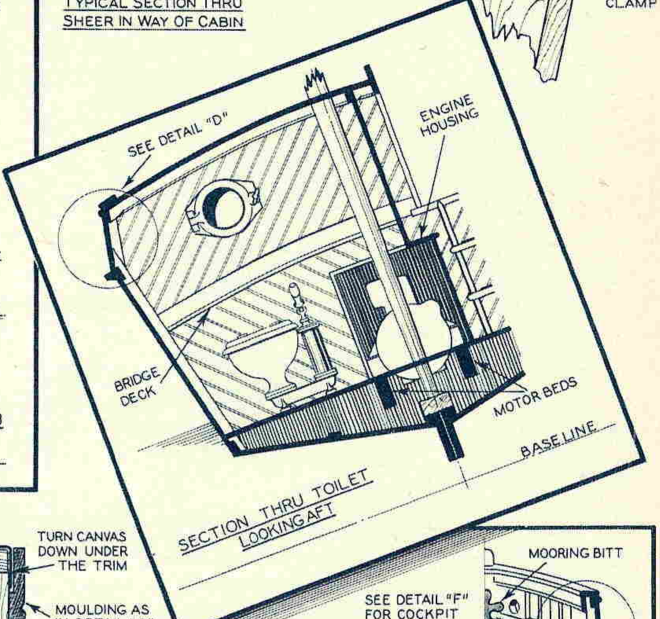

COVER BOARD
SHEER MOULD
DECK CLAMP 1 1/8" x 2 3/4"
DECKING 7/8" VEE EDGE T.& G.
DECK BEAMS 1 1/8" x 3" SEE FIG.5 FOR DETAIL OF KEY LOCK AT ENDS
(12)
ALLOW SIDE FRAMES (12) TO EXTEND. TRIM TO SUIT TUMBLE HOME
MAIN CLAMP 1 1/8" x 2 3/4"
GUARD
(12)

DETAIL "D"
TYPICAL SECTION THRU SHEER IN WAY OF CABIN

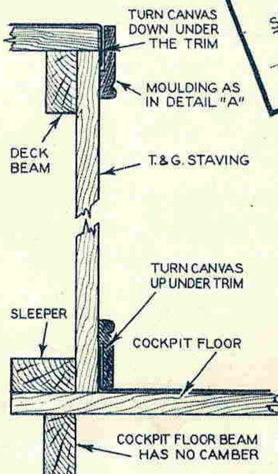

7/8" MAHOG.
4"
RAIL CAP FORMED BY CONTINUATION OF COVER BOARD
TRIM MOULDING
SHEER MOULD
FILLER SAME THICKNESS AS DECK AT AFTER END. TAPER TO TO A THIN EDGE AT BOW END
DECK CLAMP
CAULKED DECKING 7/8" X 1 3/4" FIR
STRAIGHT BEAMS
GUARD
MAIN CLAMP

DETAIL "E"
TYPICAL SECTION THRU SHEER AT FORWARD DK.

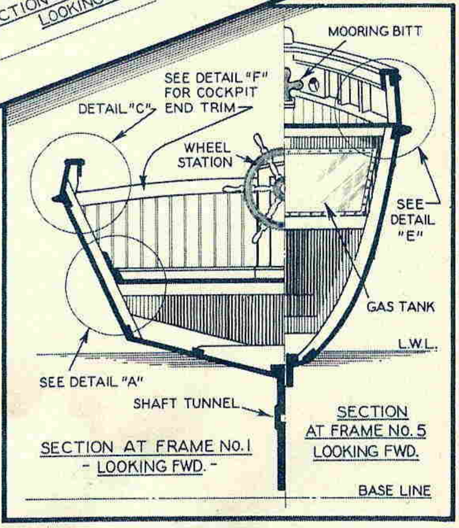

DOOR TO TOILET—SEE SECTION THRU TOILET
DISH RACK
SHELF
STOVE
BERTH
L.W.L.
FLOOR BEAMS - 1 1/8" x 2 1/4" -
FLOORING 7/8" T. & G. STOCK
SECTION AT FRAME NO. 3
LOOKING AFT
BASE LINE


SEE DETAIL "D"
ENGINE HOUSING
BRIDGE DECK
MOTOR BEDS
BASE LINE
SECTION THRU TOILET
LOOKING AFT

Shown in these illustrations are the cross-section views of Frame 3 looking aft, Frames 1 and 5 looking forward and Lavatory looking aft. Upper right shows sectional views of sheer. Drawings are all in fair scale, but should be laid out full size.


TURN CANVAS DOWN UNDER THE TRIM
MOULDING AS IN DETAIL "A"
DECK BEAM
T.& G. STAVING
TURN CANVAS UP UNDER TRIM
SLEEPER
COCKPIT FLOOR
COCKPIT FLOOR BEAM HAS NO CAMBER

DETAIL "F"
SECTION THRU ENDS OF COCKPIT


MOORING BITT
SEE DETAIL "F" FOR COCKPIT END TRIM
DETAIL "C"
WHEEL STATION
SEE DETAIL "E"
GAS TANK
L.W.L.
SEE DETAIL "A"
SHAFT TUNNEL
SECTION AT FRAME NO. 1 - LOOKING FWD. -
SECTION AT FRAME NO. 5 LOOKING FWD.
BASE LINE

On the after deck there should be fitted two small bitts securely fastened for towing a dinghy or a disabled boat if necessary. A small ventilated hatch should also be fitted on the deck over the tiller or quadrant with hatch cover to fit over wood ventilator.

A standard type boom jack should be made to take the main boom when the mainsail is furled. A ring buoy attached to this so as to be readily removable has often been an instrument to which many people owe their lives. This buoy may be dolled up with the boat's name and the owner's and club flags to look real yachty. A binnacle may be fitted in the cockpit ahead of the wheel box if desired or the ordinary box compass may be used in any position convenient to the helmsman. If the compass be of the box type it should be installed so as to set in a series of strips on the deck so that it will always be placed in the same position. In this way only is it possible to log the courses and follow them at all times. While it was felt that topping lifts on such small booms would be a nuisance, they may be fitted if the builder so desires. The topping lift should be bearded in the way of the gaff to prevent chafing and to give the boat a real go-to-sea look.

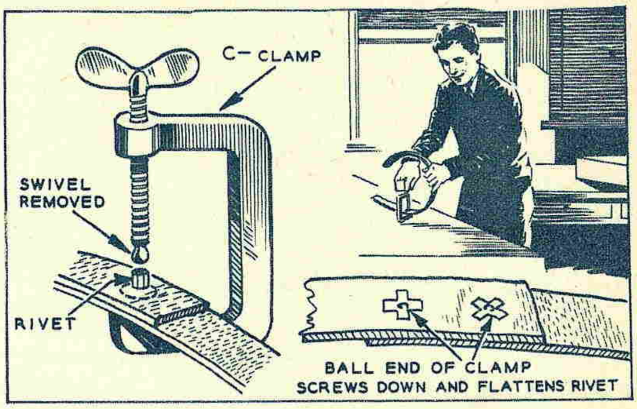
Well constructed and well found *Flying*

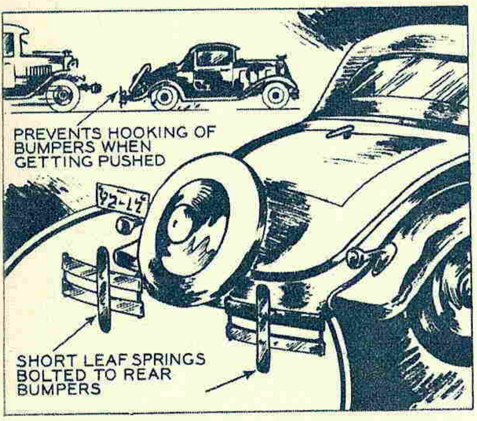
[*Continued on page* 132]

New Wrinkles for the Autoist

Clamp Rivets Brake Lining

WHEN installing new brake linings in the wheels of his car, the autoist is very often confronted with the problem of flattening the copper tubular rivets properly. A simple way to secure the rivets to the brake lining is by flattening them with an ordinary ten-cent "C" clamp from which the swivel has been removed. The rivets will spread uniformly without splitting as is often the case when flattened with a nail set.—A. Waychoff.


C— CLAMP
SWIVEL REMOVED
RIVET
BALL END OF CLAMP SCREWS DOWN AND FLATTENS RIVET

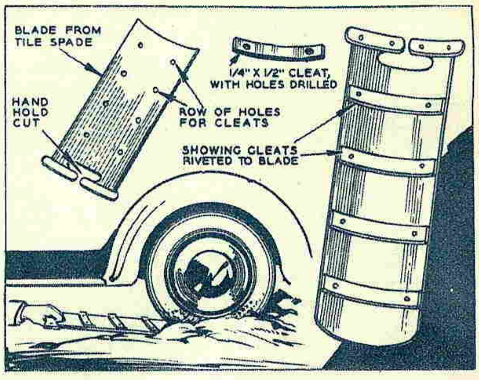

PREVENTS HOOKING OF BUMPERS WHEN GETTING PUSHED
SHORT LEAF SPRINGS BOLTED TO REAR BUMPERS

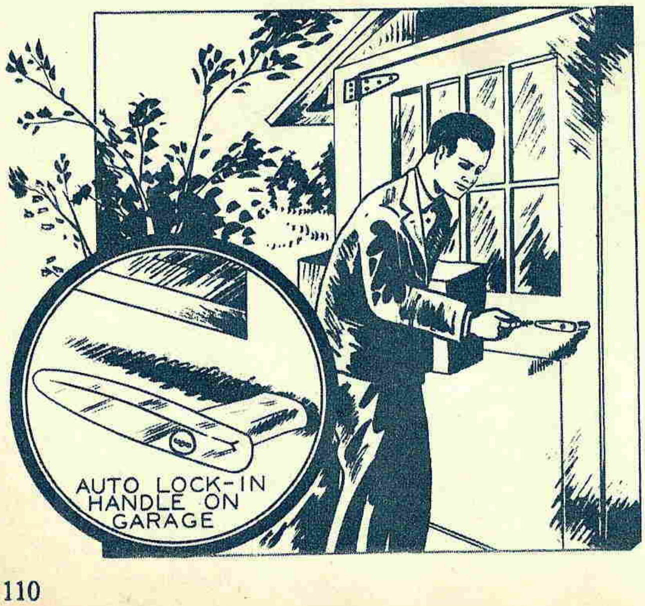
Spring Leaves Form Fender Guards

SHORT lengths of auto spring leaf salvaged from a broken spring can be converted into fender guards that will prevent cars with high bumpers from running up over your car's bumpers and damaging the fenders. Select short leaves and drill two holes in each guard to correspond with the holes on the original bumper mounting and install by removing the bolts and slipping the spring leaves over them. Where the spring is too hard to permit drilling, soften by heating.—Bob Poulson.

Metal Trough Frees Car Stuck In Mud

PERSONS who find it necessary to drive over soft clay or sandy roads continuously will find this simple spade device excellent for freeing bogged wheels. A length of heavy sheet iron is cut to the shape shown and curved slightly so that it can be worked under the rear wheel of the car. Strips of ½-inch by ¼-inch strap iron are cut to the width of the sheet iron and fastened to the sheet iron to form cleats.—A. H. Waychoff.


BLADE FROM TILE SPADE
HAND HOLD CUT
1/4" X 1/2" CLEAT, WITH HOLES DRILLED
ROW OF HOLES FOR CLEATS
SHOWING CLEATS RIVETED TO BLADE


AUTO LOCK-IN HANDLE ON GARAGE

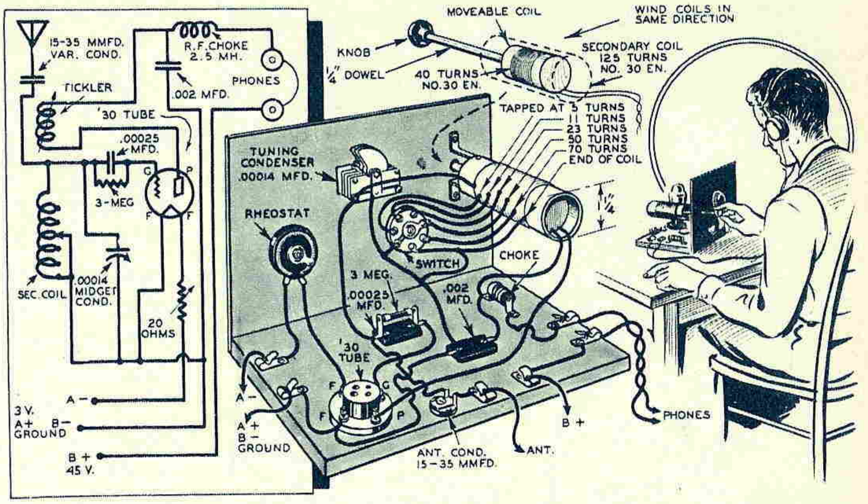
Handle Locks Garage Door

A HANDLE type door lock salvaged from a junked car makes a practical garage door locking mechanism. Remove both the handle and the catch from the car and install in the garage door by gouging out the end of the doors so that the lock and catch can be inserted. These should be fitted up carefully so that when the doors come together the catch will engage freely.

By checking the serial number of the door lock a key can be obtained for the lock from any locksmith. Car owners can often duplicate the lock used on their car so that one key may be used for locking ignition, car and garage.—Bob Poulson.

RADIO SPARKS

One Tube All-Wave Set Designed For Beginners


15-35 MMFD.
VAR. COND.
R.F. CHOKE
2.5 MH.
PHONES
.002 MFD.
TICKLER
'30 TUBE
.00025
MFD.
G
P
3-MEG
F
F
SEC. COIL
.00014
MIDGET
COND.
20
OHMS
A −
3 V.
A+ B−
GROUND
B +
45 V.
MOVEABLE COIL
WIND COILS IN
SAME DIRECTION
KNOB
¼" DOWEL
40 TURNS
NO. 30 EN.
SECONDARY COIL
125 TURNS
NO. 30 EN.
TAPPED AT 5 TURNS
11 TURNS
23 TURNS
50 TURNS
70 TURNS
END OF COIL
TUNING
CONDENSER
.00014 MFD.
RHEOSTAT
SWITCH
CHOKE
3 MEG.
.00025
MFD.
.002
MFD.
'30
TUBE
F
G
F
P
A −
A +
B −
GROUND
ANT. COND.
15 − 35 MMFD.
ANT.
B +
PHONES
1¼"

Built with a minimum number of parts, this all-wave one tube receiver is ideal for the beginner. A tap switch permits tuning from 25 to 550 meters without the use of plug-in coils. A sliding tickler coil controls regeneration. Wiring the set from the pictorial diagram will greatly simplify construction. Two batteries supply current.

FOR the radio beginner who has never before built a receiving set, this little device is recommended due to the extreme simplicity of its construction. Although only a pair of flashlight batteries and an inexpensive B battery are required for supplying power the set, under favorable conditions, will tune in broadcasts from all parts of the world.

Through the use of an ingenious tapped coil tuning from 25 to 550 meters is accomplished without the use of the usual bothersome plug-in coils. A coil sliding inside the tapped coil controls regeneration and thus eliminates the use of the usual variable resistance and fixed condenser ordinarily used for this purpose.

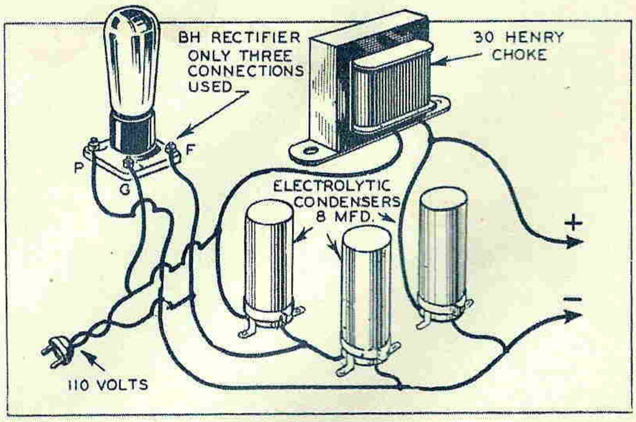
The set is assembled on a wood panel and plywood or hard rubber panel of any convenient size. The various components shown in the pictorial plan are mounted in their respective positions and the receiver wired up, following either the schematic or pictorial wiring diagrams.

The tapped coil is wound on a 1¼-inch bakelite or cardboard form and consists of a total of 125 turns tapped at 5, 23, 50 and 70 turns with leads taken off to a 6-point tap switch. The tickler coil, which controls the regeneration, is a solid wooden cylinder having a diameter of 1 inch and wound with 40 turns of No. 30 enameled wire. The tapped coil is wound with similar wire. A knob and dowel rod extending through the set panel permits the wood tickler coil form to be moved in and out during tuning.

Connect the set to a 75-foot antenna and adequate ground for best results.

Simplest B Power Supply

THIS simplest form of B power supply can be used for any number of purposes in the radio workshop. By employing a BH type rectifier tube no filament or power transformer is needed so that it can be assembled in a small container. Three 8 mfd. electrolytic condensers, a 30 henry choke and 4-prong tube socket comprise the parts needed.


BH RECTIFIER
ONLY THREE
CONNECTIONS
USED
30 HENRY
CHOKE
P
F
G
ELECTROLYTIC
CONDENSERS
8 MFD.
+
−
110 VOLTS

This B power supply will find many uses on the experimenter's workbench. Its distinct feature is in the fact that no power transformer is required. The rectifier tube is of the BH type.

BUILD THIS PORTABLE "HAM"

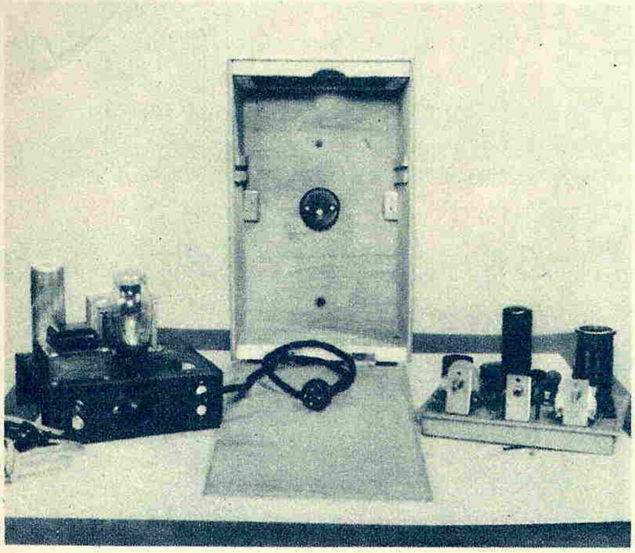
by Lester Bauer

DESIGNED for stationary or portable work this compact amateur transmitter is the logical solution to the amateur's problem of selecting a suitable outfit for portable or fixed use. Provided with a removable A. C. power supply which can be substituted with batteries when used in an automobile or boat the transmitter is unique in the fact that it can be carried about like a portable typewriter.

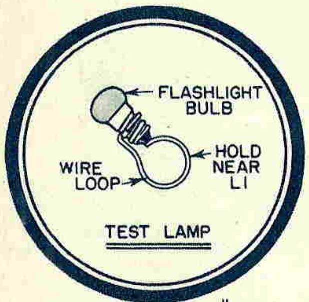
Plywood forms the carrying case which can be built to the size most convenient for the amateur. On the original transmitter the carrying case measured 6 inches deep, 9 inches wide and 15 inches high. The height may vary depending upon the size of the power supply chassis used.

Inexpensive and simple to build, tri-tet transmitter uses the new 6L6 beam power tube which will deliver from 10 to 25 watts output with plate voltages ranging from 200 to 400 volts, making it an efficient home or portable transmitter with a minimum of parts and expense. This transmitter used with a 132-foot piece of wire for antenna and working on 40 meters has worked west coast stations quite consistently.

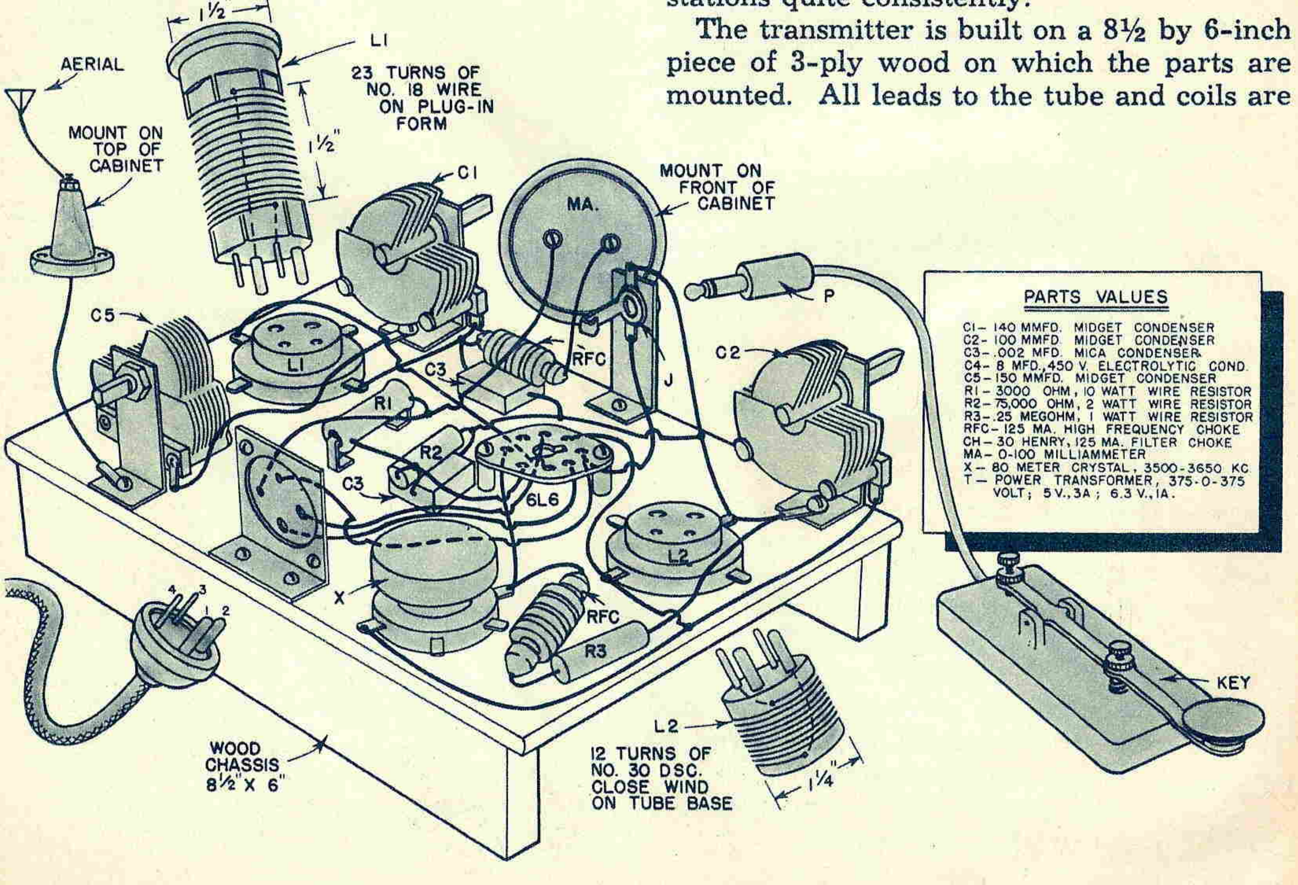
The transmitter is built on a 8½ by 6-inch piece of 3-ply wood on which the parts are mounted. All leads to the tube and coils are



The components of the portable amateur transmitter are pictured here. The power supply, on the left, employs an 83 rectifier for providing plate current. The carrying case appears in the center with the "breadboard" transmitter at right.


FLASHLIGHT BULB
WIRE LOOP
HOLD NEAR L1
TEST LAMP

The transmitter is assembled on a plywood base as shown below. Following the pictorial wiring plan will eliminate many construction difficulties. The corner of one of the outside plates of condenser C-2 is bent so as to short circuit cathode coil when condenser is fully meshed.


1½"
L1
23 TURNS OF NO. 18 WIRE ON PLUG-IN FORM
1½"
AERIAL
MOUNT ON TOP OF CABINET
C1
MA.
MOUNT ON FRONT OF CABINET
P
J
C5
L1
C3
RFC
C2
R1
R2
C3
6L6
L2
X
RFC
R3
4
3
1
2
KEY
L2
12 TURNS OF NO. 30 DSC. CLOSE WIND ON TUBE BASE
1¼"
WOOD CHASSIS 8½" X 6"

PARTS VALUES

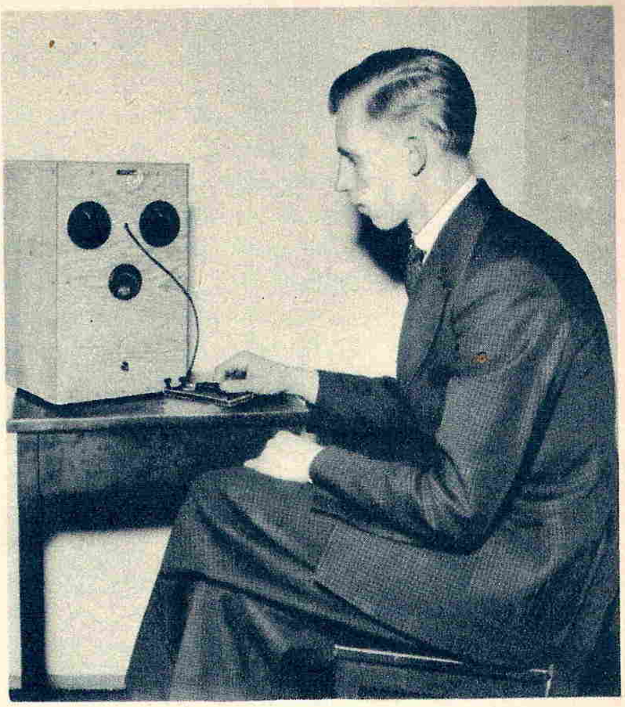
C1– 140 MMFD. MIDGET CONDENSER
C2– 100 MMFD. MIDGET CONDENSER
C3– .002 MFD. MICA CONDENSER
C4– 8 MFD., 450 V. ELECTROLYTIC COND.
C5– 150 MMFD. MIDGET CONDENSER
R1– 3000 OHM, 10 WATT WIRE RESISTOR
R2– 75,000 OHM, 2 WATT WIRE RESISTOR
R3– .25 MEGOHM, 1 WATT WIRE RESISTOR
RFC– 125 MA. HIGH FREQUENCY CHOKE
CH– 30 HENRY, 125 MA. FILTER CHOKE
MA– 0-100 MILLIAMMETER
X– 80 METER CRYSTAL, 3500-3650 KC
T– POWER TRANSFORMER, 375-0-375 VOLT; 5 V., 3A; 6.3 V., 1A.

TRANSMITTER

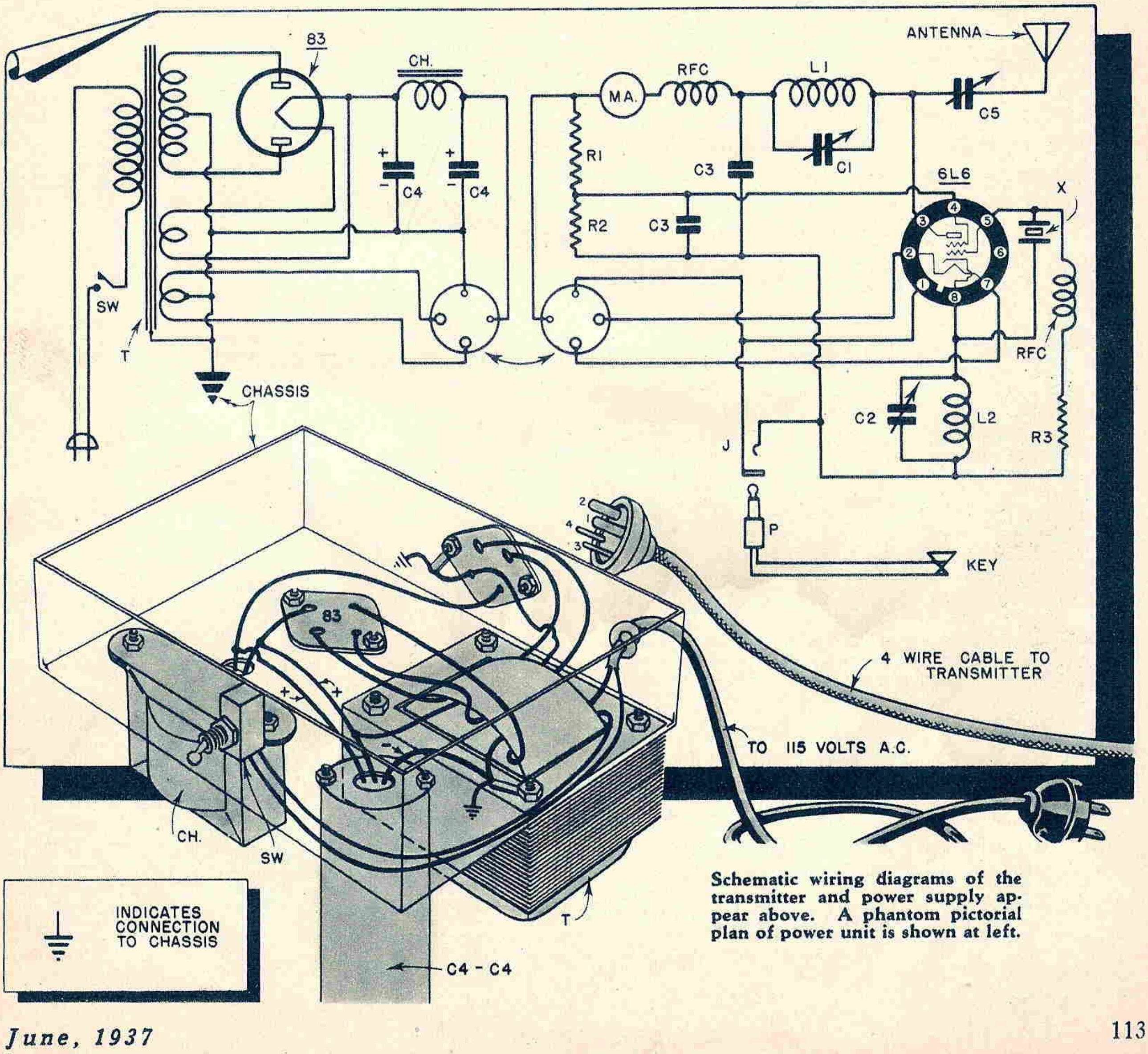
made as short as possible. The two tuning condensers, C1 the plate tuning condenser and C2 the cathode tuning condenser, are mounted at the front along with the phone jack for the key and mounted so as to slide into the outer cabinet. The cathode tuning condenser at the left has one plate bent so as to short circuit the coil when fully meshed. This is done when 40-meter operation or the second harmonic output is to be used. The plate condenser at the right will tune both the 80 and 40-meter amateur bands.

The power supply is mounted on an 8 by 6 by 2½-inch metal frame and the power connections are brought out to a 4-wire cable which plugs into the transmitter baseboard. For portable work, the power supply is removed, leaving space for the bug key and wire during transportation. The 4-wire cable is

[*Continued on page* 128]



Provided with a removable A. C. power supply which can be replaced with batteries, for outdoor use, this portable transmitter proves ideal for beginners or advanced amateurs.


83
CH.
C4
C4
SW
T
CHASSIS
MA.
RFC
L1
ANTENNA
C5
C1
C3
R1
R2
C3
6L6
X
RFC
C2
L2
R3
J
P
KEY
4 WIRE CABLE TO TRANSMITTER
TO 115 VOLTS A.C.
CH.
SW
T
C4 - C4
INDICATES CONNECTION TO CHASSIS

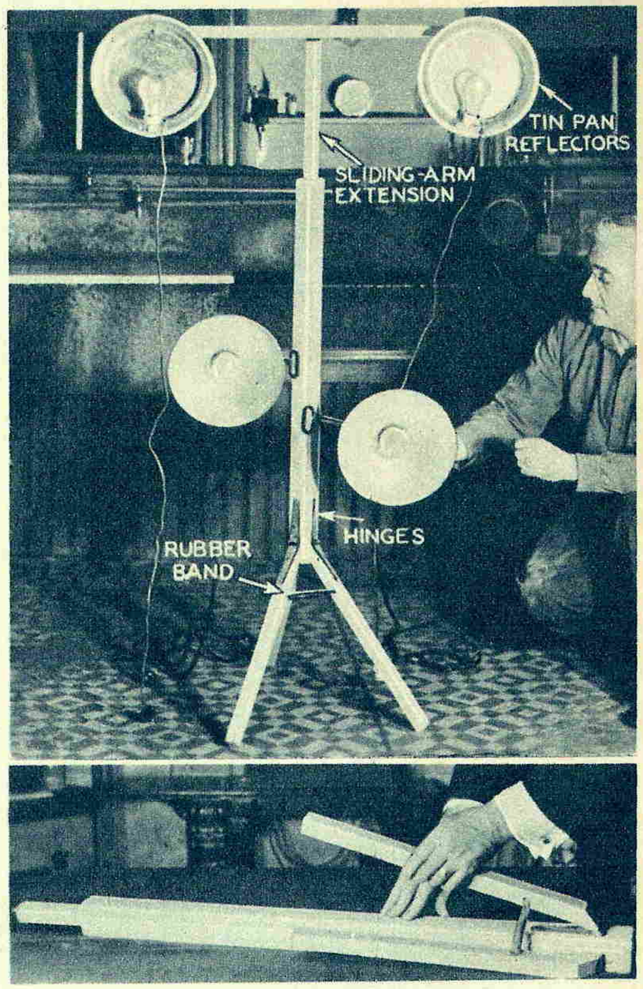
Schematic wiring diagrams of the transmitter and power supply appear above. A phantom pictorial plan of power unit is shown at left.

Photo Floodlight Stand Folds Into Compact Unit

INVOLVING only simple construction this folding floodlight stand makes a useful addition to the amateur photographer's equipment. The stand is assembled from white pine stock. The main upright consists of a square tube formed from four pieces of ½"x1½"x3' stock. Assemble the pieces so that the opening in the tube is 1"x1" or just large enough to accommodate the sliding arm extension rod which is a length of 1"x1"x3' stock. This may have to be sanded or planed down in order that it will fit inside the tube. If the extension fits loosely in the tube drill holes at various intervals through the upright tube for inserting a "stop" pin for holding the extension in position.

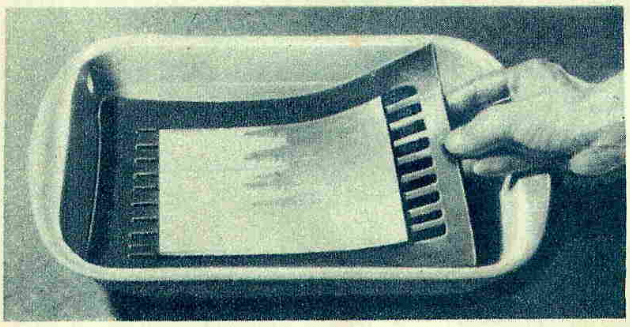
The cross-arm is fitted to the top of the extension by means of a skewer stick which inserts in a ¼" hole drilled in the top end of the sliding extension. A tripod arrangement is attached to the bottom of the upright and consists of three strap hinges to which are attached 1"x1"x18" lengths of stock. A ¼" hole drilled through the upper portion of each leg permits insertion of a rubber band to hold the legs at a uniform distance.

The reflectors consist of tin pans attached to the cross arm and fitted with porcelain cleat sockets wired to fixture cords.



This floodlight stand is constructed entirely from white pine and folds compactly when not in use. Tin pans fitted on the sliding arm extension provide reflection for photoflood bulbs.

Mat Aids Print Developing

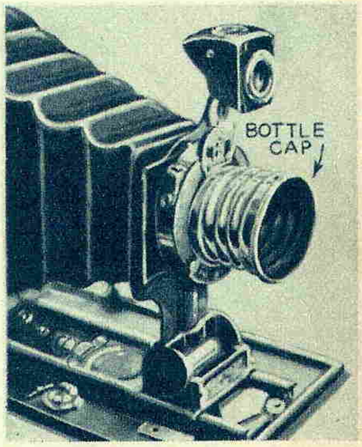


A rubber stair pad placed in the bottom of developing trays eliminates prints sticking to bottom. The raised tread surface permits ready removal of prints from solution as shown here.

DIFFICULTY of having large projection prints stick to the bottom of the developing tray can be eliminated simply by placing a rubber stair mat in the bottom of the tray before inserting prints to be developed. The surface of these rubber mats being raised permits a firm grip to be obtained on the print without the usual slipping of the fingers or tearing of the edges of the photographs during their removal.

Lens Shade From Bottle Cap

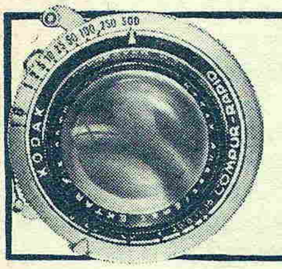
A SCREW type bottle cap taken from a large glass container makes a satisfactory lens shield. First cut the end off the cap so that it can be snugly fitted over the lens. If the cap is sufficiently large the lens can be removed from the camera and the cap shield placed directly over the threaded stud and the lens screwed back into position. Paint inside cap black.



A practical glare shade for the camera can be made from a tin bottle cap simply by cutting off the end and slipping it over the camera lens as illustrated.

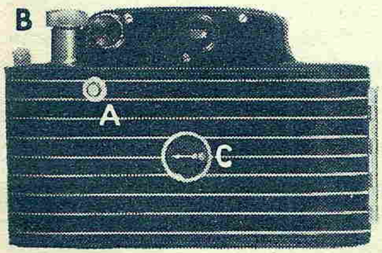
Picture Story
of Eastman's Finest Miniature
KODAK BANTAM SPECIAL

LENS . . . Super-speed, super-corrected Kodak Anastigmat EKTAR *f.2.0.* Shoot early or late, in sun or rain; go after lightning-swift action; snap away indoors at night—your negatives will be needle-sharp; they'll yield big, detailed enlargements. (Standard, low-cost enlarged print size is 2¾ x 4 inches.)



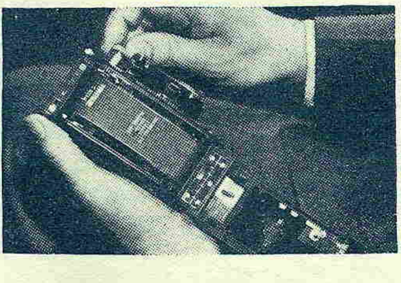
COMPUR-RAPID SHUTTER

Nine speeds (1 to 1/500) capitalize to the full the Kodak Bantam Special's ability to cope with swift action, or difficult light conditions.



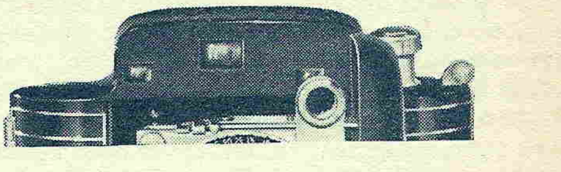
AUTOMATIC FILM CENTERING DEVICE

. . . Press button "A" while turning winding knob "B" about a half turn, then release the button and continue winding until knob locks. Film is then in position for the next exposure. You uncover film window "C" only to check the number of exposures made.

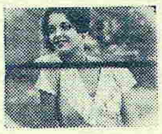


CONVENIENT LOADING

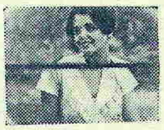
. . . Pull-out lock opens the hinged back. As the illustration shows, the winding knob can be extended beyond the housing of the camera for easier winding of the film.



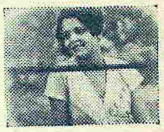
RANGE FINDER . . . . Split-field, military-type; coupled with focusing mechanism; adjustable to user's vision. Range is found by moving focusing knob. When the split image is brought into a straight line, camera is in focus.



As image will appear when range finder is set for a distance shorter than the correct one.



As image will appear when range finder is set for a distance greater than the correct one.



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China's Millions Twist Dials

[*Continued from page* 79]

are used chiefly for the broadcasting of official orders and instructions.

In Ningpo, Tientsin, Tsingtao, Wusih, Chiahsing, Soochow, Wuhu and Shanghai, however, all important commercial centers as well as seats of local governments, the stations are largely privately owned and are used to serve business interests. Here energetic salesmen solicit sponsors for programs, announcers declaim the merits of toothpaste and cigarettes, and one hears talk of "sustaining" and "commercial" time schedules.

Shanghai is the country's leading radio center, and the source of most of the purely entertainment programs. Of its 39 studios, all except four are under private ownership and have as their principal objective the dissemination of advertising and entertainment. The programs, in general, follow the technique of the west, but invariably retain a distinct and characteristic Oriental twist, aside from the almost universal use of the Chinese language by the Chinese-owned stations.

For example, in spite of the whole-hearted acceptance by the Chinese people of the modern facilities and equipment which bring them their radio programs, they extend their greatest favor to the most ancient type of program, the Chinese story-teller. This is a type of entertainment which has come down through the ages and thrived in a nation where less than ten per cent of the population is literate The story-teller puts on a one-man show, accompanying himself on a stringed instrument resembling a guitar. His subject matter consists of the age-old tales and legends of the people. Some of the stories are accounts of the exploits of emperors; others have to do with the life of the masses, while still others are simple fairy-tales. But the telling of the tales is more than a reading; the performance takes on the characteristics of high drama, and the episodes are both moving and exciting.

Radio plays are also popular with a race which probably more than any other delights in going to the theater. In western countries the legitimate stage may languish as a result of competition from the moving pictures, but in China the screen dramas in a strange language have to struggle for popularity against stage plays in the Chinese language. The radio, however, is peculiarly fitted to supplement stage performances, and brings the pleasure of theatricals to families which can seldom afford to visit the theater. And since the Chinese stage pays little attention to scenery, concentrating on action and characterization, the native drama suffers little by transfer to the ether, and is one of the greatest attractions to the Chinese dial-twisters.

News broadcasts also find a large and enthusiastic audience. Enterprising Shanghai newspapers have agreements with various radio stations to broadcast the news at regular intervals during the day, and the Chinese public, as news-hungry as any in the world, often turns to the radio receiving set as its sole source of information.

Other programs provided by the stations include modern Chinese music and Chinese jazz. The long-drawn wail of Chinese lady singers, particularly those affecting the Soochow accent, affect Chinese swains in the same manner that American crooners are supposed to affect feminine hearts. A Soochow accent might be compared to the southern accent in America, and is sedulously cultivated by the lady crooners as an item of charm.

But radio stars as such have not developed in China, and there are virtually few outstanding performers whose names and talents are nationally famous. There are two reasons for this; one is that fans tune their sets to certain stations for certain types of programs, and personalities of the performers mean little; the second is that a large portion of the radio talent is drawn from the amateur ranks, with consequent large turnover. The young men and women who take part in radio plays or who sing before a microphone at night, quite often work in stores and offices during the day-time and so are unable to devote to radio the time and effort which bring eminence and publicity to the professionals.

Use of amateur talent, on the other hand, can be tremendously popular, as radio listeners in America know, and the extent of the amateur field in China would probably warm the heart of Major Bowes. A few of the amateurs have graduated into the professional ranks, but a majority continue their regular daily work in other lines of endeavor.

Some of the most outstanding amateur programs broadcast in China today emanate from the studio of Station XHHS, representing the Radio Amateurs' Home, a unique institution devoted to the non-professional in every aspect of radio. This organization has performed a notable public service during the years by bringing advanced radio knowledge to amateurs in China.

Not only does it sell equipment for amateur receivers and transmitters, but it engages in extensive educational work to spread public knowledge of radio. Aspiring "hams" are taught how to assemble sets and are given advice and help in ironing out all their problems. A magazine "China Radio," is published in the interest of amateur activities, to keep radio enthusiasts in this country fully apprised of developments in China and abroad. The station XHHS, featuring youthful entertainers, among whom the Wong sisters enjoy a high degree of popularity, draws a large home audience. In the evening, after an early dinner, the largest number of Chinese settle themselves for an evening at the radio dials, and thousands tune in to XHHS.

XQHC with a power of 1,000 watts is also located in Shanghai. It is operated by the Ministry of Communications, but offers programs of pure entertainment, and is not concerned with official business. Its equipment is probably the

[*Continued on page* 131]

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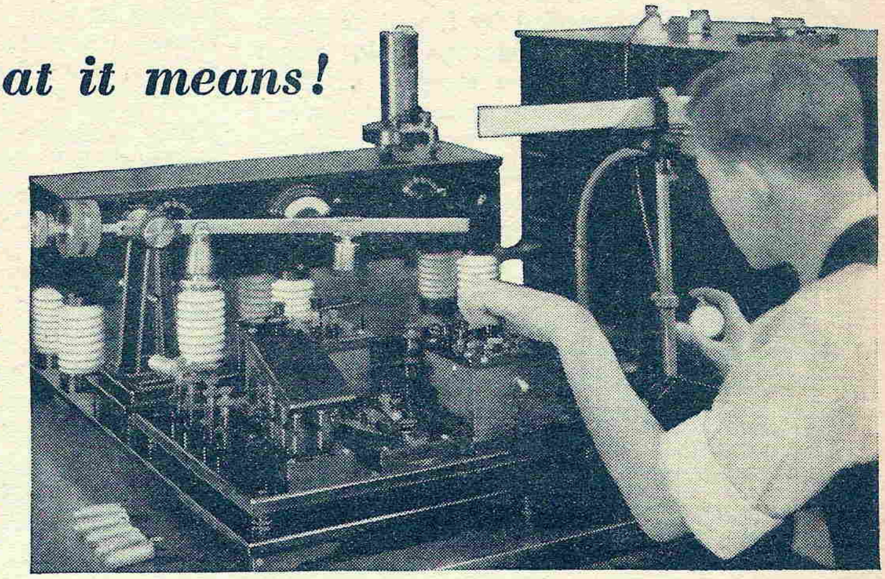

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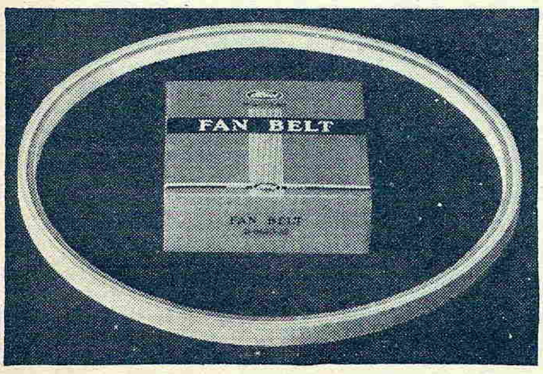

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This kit contains all of the necessary parts to do a complete job of spindle rebushing. Price complete, $2.70.

Housekeeping In A Trailer

[*Continued from page* 72]

vacation trips. It is not an exaggeration to state that the modern trailer kitchen has in it more labor-saving and other housekeeping conveniences than are to be found in many permanent homes throughout the country.

Running water is supplied by faucet or pump in the sink, usually from a storage tank. Some trailer models have pressure systems of their own; others connect with city water systems.

Ingenious devices are utilized to give the maximum convenience, use every inch of space and yet preserve the air of a living room. The cookstove, for example, and often the sink may be cancealed in what appears to be only an attractive buffet. When meal time comes around, a "trapdoor" is lifted, and lo, there is the sink or stove!

Our trailer dining room is like a cozy breakfast nook with big, comfortable upholstered seats flanking a dining table that lets down from the wall and is large enough to accommodate from four to six persons. We set the table with unbreakable dishes that come in attractive pastel shades and are made to nest easily thus saving cupboard space.

As for meals, the trailer traveler is not, of course, required to rely solely on canned goods. The roadside stands and farmhouses along the way offer an abundance of fresh fruits and vegetables, eggs, broilers, milk, cheese and ice cream. But, when a meal from canned goods seems desirable it can be most palatable and satisfying with trailer conveniences to give it the same cooking skill that would be given at home.

A one-hole fireless cooker is a joy to have along on a trailer trip. It takes up a little space but it is well worth it for it minimizes, not only the time spent in preparing the principal meal of the day, but also the heat required at meal time, which in the summer touring season may be the warmest time of the day.

If one of those "meal-in-one" dishes is prepared early in the morning before the day's journey is started or other plans for the day undertaken, dinner can then be forgotten until the actual mealtime arrives. When the stop is finally made for food in some restful, scenic spot, all that is required is to open up the fireless cooker and the main part of the meal is ready.

This "meal-in-one" dish may be Mexican rice, chili con carne, Swiss steak, Huntley stew or any one of a number of combinations which every housekeeper knows and uses at home in casserole cookery.

With soup or tomato juice cocktail to start the meal and a vegetable combination salad tossed together quickly (from vegetables which have been crisping all day in the trailer ice box), fresh fruit and cookies for desert, a thoroughly satisfactory meal can be provided in a very few minutes.

A pressure cooker is also a short cut to good meals. If you buy a piece of meat from an unknown butcher en route, you cannot be certain how tender it is and you may be a hundred miles away when you are ready to cook it. Or you may have climbed to a high altitude where a longer cooking period must be allowed. But with a pressure cooker you need not worry. In this magic pot, steaks or chops or vegetables can be cooked in four minutes—all together! And the cooker will even whistle to let you know when to take it off the stove!

"A place for everything and everything in its place" is absolutely essential to peace of mind in trailer travel. The husband who objects to finding his pajamas in the same drawer with the tire chains and the remains of a chocolate cake has some grounds for complaint. With a little system, however, the "chores" can be done in a few minutes each day leaving ample time for recreation or travel.

A few suggestions based on experience are offered for what they may be worth:—

Try using double cotton blankets to sleep between instead of sheets. You will find them very comfortable in all kinds of weather. They are easy to launder as they do not require ironing and being double at the bottom helps to keep the blankets or quilts in place.

Pillows may serve the double purpose of cushions in the daytime and bed pillows at night if you will make covers for them out of the same material as the upholstering of your beds or your drapes. Either make or have them made with zippers, snaps or buttons to close after the pillow is put in. Placed at the end of your studio couch they are both attractive and convenient. As important a feature, however, is the fact that you do not have to have any storage space reserved for them and this is always a big item in trailer housekeeping.

Wide-mouthed mason jars with glass covers in one-half pint, pint and quart sizes make ideal containers for putting away left-overs. They keep your icebox free of odors and the contents will not spill in traveling. They will not break in transit if placed so they do not have too much space to shift around. Wide rubber bands or small inner tube sections slipped around the outside of them make excellent bumpers.

A wooden step with a foot-scraper placed outside the door will help to keep sand and mud out of your trailer.

Straps of upholstery material, similar to the trailer cushions and drapes, tacked to the wall and fastened together with buckles will hold golf clubs or fishing tackle firmly in place while traveling.

But, once you have embarked on the "magic carpet" you will make fascinating discoveries of your own. That is part of the game. This playhouse living requires pliable natures. Trailer life is suitable only to those who can with complete good nature adapt their needs to what the

[*Continued on page* 126]

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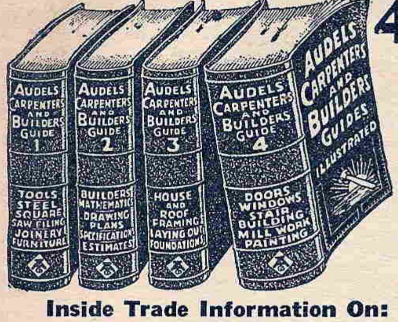
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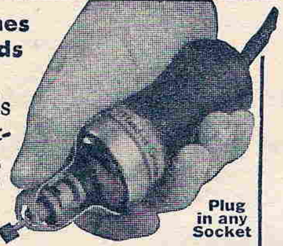

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Hammered Aluminum Ware

[*Continued from page* 91]

rim of the wooden form. Hold the disc with one hand and tap all around the edge with a soft-nosed hammer until it commences to rise. This process is continued slowly, rotating the disc as the hammering proceeds, gradually working in towards the center.

When the bowl has thus been partially formed it is laid on the bench and a line of nail-set impressions hammered close together around the 3-inch circle scribed for the base-line. This is done to differentiate between the sweep of the sides and the level base. The hammering also tends to harden and stiffen this union.

If at any time the constant hammering to shape of a piece should harden the material to the extent that danger of cracking occurs it should be annealed at once. Do this by heating to a cherry red and allowing the metal to then cool naturally when it will be as soft as before. For ordinary work this will not be necessary.

The deeper form is substituted for the shallow one and the hammering of the bowl continued, evenly around the sides until they fit the form. No tapping, of course, is done within the base circle as this is to remain flat. As the dish nears completion it is trued up by eye by spinning it on a horizontal revolving table. With the eye on a level with the edge of the bowl any unevenness can be quickly perceived and measures taken to hammer out any such inequalities.

The finished shape is next placed on edge and the rim again tapped to thicken it and true it even more. It is then turned over on the bench and the base itself tapped inward slightly so the bowl will set flat without any tendency to wobble.

With the final trueing wipe the inside and outside with steel wool to clean the surface and take off any burrs which may have occurred from stenciling with the nail-set or scribing with the dividers. The bowl is now ready for engraving.

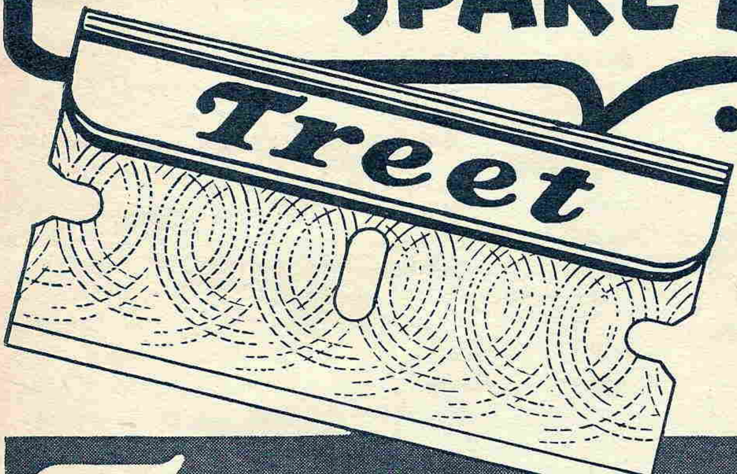
The layout of the intended design is penciled on the inside surface sufficiently complete to follow with the engraving tools. If desired the design can be transferred, stenciled, or traced from a pattern drawn beforehand.

Anyone familiar with engraving will have no trouble in decorating the aluminum as it is soft and pliable to the tool. Part of the design can be done, of course, with the nail-sets having various tips such as circles, ovals, half moons and stars and will greatly aid in a quick job of decorating. The nail-set is held vertically and hit a light sharp blow with the hammer. The various photographs illustrate these punch designs in detail.

The tyro engraver should operate the engraving tool with a wiggling motion, pushing straight ahead and down into the metal. A little practice on a spare piece of aluminum will soon enable anyone to do a good job. The engraving tools will pick up dirt and metal and should occasionally be cleaned out with a slip-stone or the

[*Continued on page* 144]

"MISTER, CAN YOU SPARE A DIME?"



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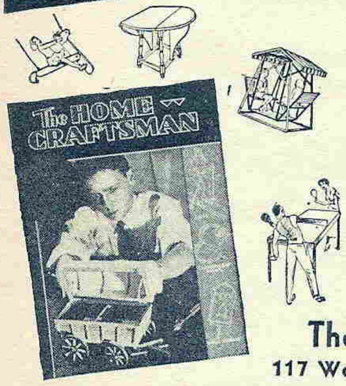

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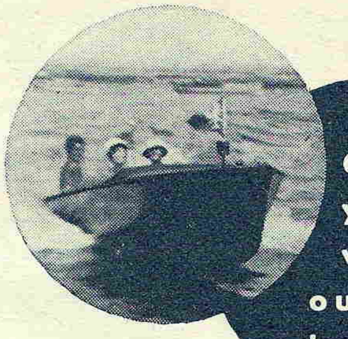

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Building Play Lot Equipment

[*Continued from page* 104]

carelessly left on driveways by their riders. A "bike" garage is one way to protect the bicycles from accidental breakage and at the same time protect them from the elements.

An individual bicycle shelter is neither difficult to make nor expensive. Consisting merely of a plywood box, open at one end and slotted at the top, upon which is erected a light framework to support a gayly colored awning. While no flooring is provided in the box one can easily be made if desired. Shelves on the inside of the box provide ample storage space for spare tires and tools and other stray articles. Increasing the width of the box permits an additional bicycle, scooter or tricycle to be accommodated.

Protect the "bike" garage from rain by painting it with two coats of good paint or enamel. The ends of the plywood are first shellaced to prevent water seaping in and opening the laminations.

A wading pool is an easily built piece of equipment that will keep small children amused for hours during the hot summer days. The wading tank is constructed from a good grade of lumber and calked in the same manner as a boat.

First make the bottom of the tank by laying four ¾ by 9-inch boards on three 2 by 4-inch skids. Bevel the boards before assembling so that a vee groove is formed for calking the joints with candle wicking soaked in marine glue. Fasten down the boards to the skids with countersunk brass or galvanized iron screws, so that they will not cut tiny feet.

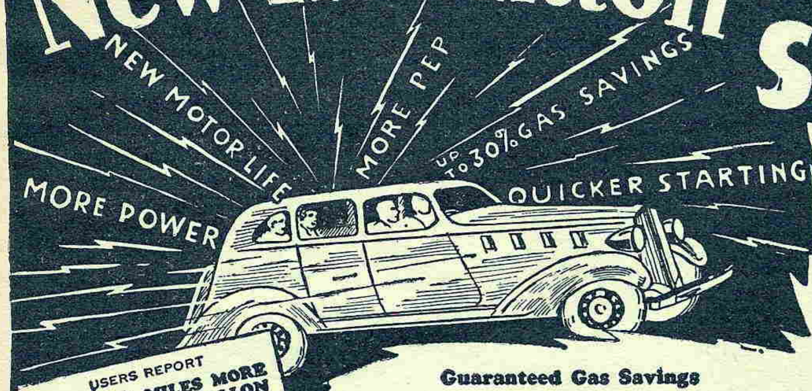
Next erect the sides of the tank using three-sided cleats along the joints. The cleats should have candle wicking and marine glue inserted under them before screwing down to the floor of the tank. Four boards, each 9 by ¾ inches are attached around the top of the tank to form seats for the young bathers. The seat boards are 4 feet 2 inches in length and rounded off at the corners as shown in the perspective plans.

Complete the tank by installing the sprinkler unit. Make this from four lengths of iron pipe connected to form a cross and bent so as to provide a support, at the same time, for the canopy. A hose coupling is provided at the end of one of the pipes and the others plugged up. Small holes drilled in the pipes provide the novel shower effect.

Whether the fox is a useful wild life citizen or a nuisance is a never-settled argument among hunters, farmers, and naturalists, but a recent study of the feeding habits of foxes suggests that B'rer Fox inclines to the useful side.

Numerous strings of beads made of ostrich egg shell are considered practically enough of a costume by Ovambo women in Southwest Africa.

New Invention WITH SUPERCHARGE PRINCIPLE SAVES GAS



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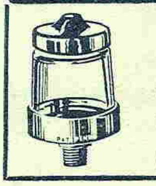

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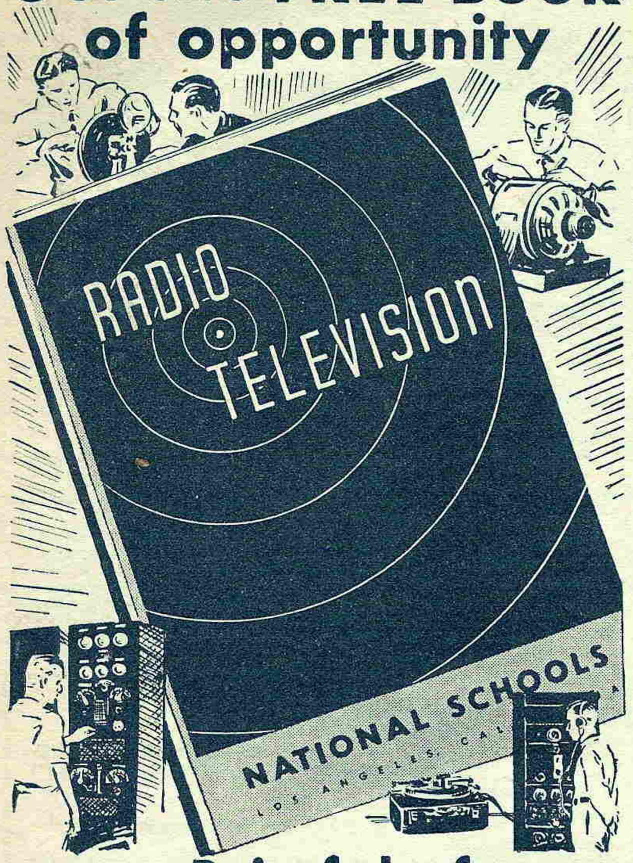

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Housekeeping In A Trailer

[*Continued from page* 120]

situation offers. The new and unforeseen is sometimes pleasant, sometimes not. Three days of rain will make country roads impassable, perhaps, for a heavy load and a stop must be made in some isolated spot. But the time passes and the caravan moves on again to the open road with its travelers clean and fresh and rested by the enforced quiet.

Anyone who has ever toured knows that all the best-looking tourist camps and the most desirable hotels seem to be reached about nine o'clock in the morning when no stop is planned. But with your house on your back you do not need to worry about this. You have food; ice; water; light; good, comfortable, clean beds; and no packing or unpacking. When you step into the trailer, your clothing is hanging unwrinkled in a full-length wardrobe and clean undergarments are in the cabinet drawers as easy to reach as they would be at home.

Luncheons each day are a fresh adventure—enjoyed whenever and wherever fancy dictates. One day it may be in the deep, north woods with no sound to break the silence but the trill of the birds; the next day on the shores of a sparkling lake; again, on the crest of a hill with a wide panorama of countryside stretched out before you.

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Such appears to be a legitimate inference from two pre-Columbian prayers in the ancient Peruvian language, newly translated by Prof. Hermann Trimborn of the University of Madrid.

The god was called Coniraya Huirakocha, the double name apparently representing separate origins of belief in two distinct but parallel cults, just as the Hebrew Jehovah and the Mohammedan Allah are looked upon as the same God.

The two prayers addressed to this powerful deity have about them some suggestion of the tone of the Hebrew Psalms. One of them is a simple plea for assistance, before the undertaking of a hard task, like the weaving of a difficult pattern in cloth: "Inspire thou me in this: give thou me knowledge hereof!"

The other is longer, and more definitely theological: "Coniraya Huirakocha, creator of mankind, creator of the earth: whatever is, is thine. Thine are thy fields, and for thee is thy mankind here!"

SAY, MACK, I'VE BEEN GETTING SWELL SHAVES WITH GILLETTE BLADES IN MY GILLETTE RAZOR LIKE YOU TOLD ME. THANKS FOR THE TIP!
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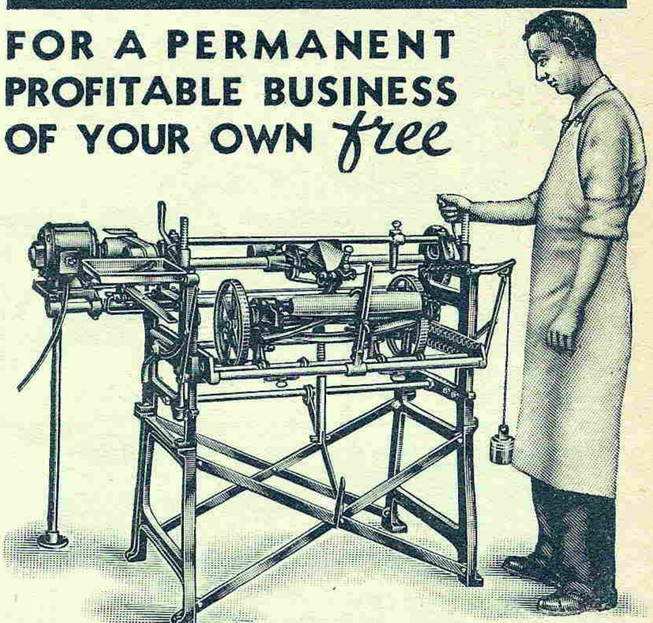

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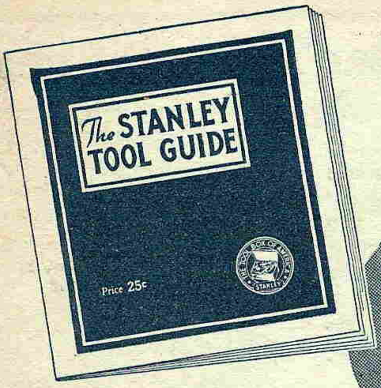

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A Portable Transmitter

[*Continued from page* 113]

then brought out the rear of the cabinet to the batteries.

The tuning of the transmitter is very simple. After the wiring has been checked, connect the power supply and wait a minute or so for the 6L6 heater to warm up, then fully mesh the cathode tuning condenser and close the key. The meter reading will probably be quite high but as the plate condenser is swung toward maximum capacity the plate reading will drop to about 15 milliamperes according to the plate voltage used. At the lowest plate reading the oscillator should light a flashlight bulb connected to a piece of wire in the form of a loop which is held near the plate coil. This is the 80 meter fundamental frequency of the crystal. For the second harmonic or 40 meter operation tune the cathode condenser about half capacity and rotate the plate condenser near minimum capacity. Another resonance point should be found and again the plate current will drop to a low reading and the flashlight bulb will glow. Now tune cathode condenser for maximum output. If two resonance points are not found, a turn or so off or on the plate coil will correct this. If these specifications are followed no trouble should be encountered.

With the transmitter oscillating connect the antenna to the antenna coupling condenser and rotate toward maximum capacity until the plate milliammeter reads about 100 milliamperes for a 350-volt power supply. The antenna is now drawing current and the set is in operation. For best antenna tuning a neon bulb should be held on the antenna post and the coupling condenser tuned until the bulb lights the brightest.

A 133-ft. antenna of No. 12 enameled copper wire can be used on both 80 and 40 meters or a 66 ft. of wire can be used for 40 meter operation only.

Any one of the many popular amateur receivers can be used in conjunction with this transmitter. If the person building the outfit is a newcomer in amateur radio it is necessary that he first secure an amateur radio operator's license before he attempts to go on the air. Complete instructions for securing a license will be found in the booklet, "How To Become A Radio Amateur." If copies of this book are desired they can be secured from the Modern Mechanix Radio Editor at 25c.

Furnishings For The Garden

[*Continued from page* 97]

center, fasten it in place rigidly and pour in the concrete.

The concrete is mixed to the ratio of four parts sand to one part of concrete. The sand and cement should be dry mixed before any water is added so that when dry no weak spots will result. The cement will seep into the holes in the reinforcing pipe and fill the pipe so that the finished pedestal will be almost unbreakable. Do not allow the concrete to set too rapidly. Casting of both the pedestal and basin should be carried on in a shady spot and not in the sunlight. After allowing the concrete to set, soak it in water so as to free it from the cardboard casting tube.

The basin is made next with one of the tin serving trays forming the center reinforcement and the other providing the form. To cast the basin lay one tray on a large flat board, bottom up. Around the edge of the tray place a strip of galvanized iron, fastening the ends together with light wire or soldering to form a perfect joint. Center the sheet metal rim and pour in concrete to a depth of one inch. The reinforcing tray is now ready for insertion, but first it must be punched full of holes so that the concrete will have a suitable anchor on which to bind.

With the second tray pressed lightly into the soft concrete you can complete the pouring operation by filling the mould to the top. After the cement has begun to set push a large cork into the center so as to provide a recess for the exposed length of pipe projecting from the pedestal. The pipe should fit moderately tight in the recess so that the basin will not wobble.

After a location has been selected for the bird bath dig a hole one cubic foot in size and set the pedestal in it, then pour in concrete and cinders to provide a substantial base.

Keep in mind the fact that birds are afraid of too much water. Never fill the basin to a depth of more than one inch. Set up in the center of the lawn, away from trees the bath is certain to attract the birds and add to the natural surroundings of the garden.

For summer luncheons the garden offers an excellent place in which to serve them. A very distinct garden table and bench can bebuild without any special tools at a cost that will not exceed two dollars. When not in use the table and bench can be folded up and stored in the basement or attic.

Unsurfaced boards, one by six inches are used through, the cleats are formed from scrap materials picked up about the workshop. The top is thirty inches by sixty inches assembled from five boards cleated together on the underside. A simple "X" construction is used for the legs. These are made in two pairs in the form of rectangles and the horizontal members are notched to fit into each other as shown in the perspective plan details. To use the table it is only necessary to open the rectangle assemblies and set the top on them.

A pair of benches to match the table are easily assembled from one by twelve inch stock. Cut the ends to a height of eighteen inches and hinge to a fifty inch by one foot side piece. The seat is a five foot by one foot plank with cleats provided at each end for inserting in the end pieces.

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Making Turned Croquet Set

[*Continued from page* 95]

ball. Locate exact center on each section and mark lightly with the point of the skew. Work from this center to each side of the round section to shape the ball. To aid in determining the spherical shape of a ball cut a template from thin wood containing an arc of a 3-inch circle. Hold this template above the turning to show up the high and low places on the ball.

When the surface of the ball turning matches the shape of the template arc, you are certain the ball will be sufficiently round for home croquet play. All four balls are shaped in this manner. Turn each ball as far as possible into the connecting axis, then remove the work from the lathe and saw the balls apart, smoothing the saw cuts by hand with coarse and fine sandpaper. Paint each ball with two coats of outdoor varnish and stripe each ball a different color, so players may distinguish their balls in play.

The mallets are turned from 2½ inch square stock. Four mallets may be turned from stock 26 inches long on a large capacity lathe or two mallet heads may be turned on a small lathe from stock 14 inches long.

Rough the square into a cylinder, then decorate with shallow markings with the point of the skew. Smooth the turning with wood file and sandpaper while the work revolves in the lathe. Bore ¾-inch holes in the center of the mallet heads for the handle tenon. Paint the heads with two coats of outdoor varnish and stripe the center marking with colors to match the stripes on the balls.

For inexpensive and tough handles use old broomsticks, cut 24 to 30 inches long. Turn a tenon, 1-inch long by ¾-inch in diameter to fit the hole bored in the mallet head. A good quality of tube glue will hold these pieces firmly together.

The two pegs are simple turnings. Mark the turning to provide ¼-inch beads between 1-inch spaces, which are colored to match the balls and the mallets in the set. The arrangement of these colored sections also show the rotation in which the players having corresponding colored balls play.

The wickets are shaped from wire to allow an opening 7 inches wide. Nine wickets are needed. The arrangement of the wickets on the court and how to play the game are familiar to practically everyone, therefore unnecessary to explain. For regulation rules of the game consult books obtainable at any public library.

Ancient Egyptian tombs were provided with a false door through which the spirit of the dead might leave and enter.

Devils Tower, Wyoming, has been a national monument for 30 years, making it the oldest monument under the National Park Service.

China's Millions Twist Dials

[*Continued from page* 118]

most modern in Shanghai, but its popularity with the masses is only moderate. Programs are broadcast in English as well as in Chinese, and include news summaries as well as musical numbers. It features programs presented by students of the various middle schools.

The Municipal Government of Greater Shanghai (Chinese areas) also operates a station, XGOI, from the Civic Center located in the territory bombed by the Japanese in 1932 but now rapidly becoming one of the show-places of Shanghai with its resplendent buildings housing the local Chinese government organs. XGOI has a spasmodic schedule, however and is heard only when unusual events are being staged at the Civic Center. Principal sports competitions, in the Civic Center stadium are broadcast on a play-by-play basis from XGOI which becomes one of the most popular stations in the country for the duration of the event. Although its power is only 500 watts it is consistently heard in even the most remote sections of the country.

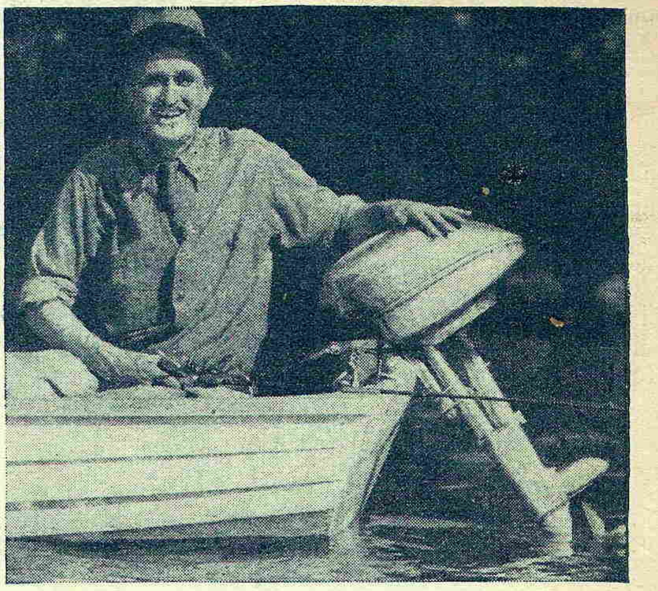
XMHA is the best-known foreign station, and broadcasts all programs in English. It is American owned and is run similarly to a station in the United States. Another American station was recently sold to Japanese interests, and now broadcasts programs in English, Chinese and Japanese.

On the days of the National State Lottery, the microphones of four local stations are installed at the Canidrome where the drawings take place, and as each number is drawn from the drums, the digits are announced simultaneously in Chinese, English, French and Russian.

Contrasting sharply with American practice, two religious stations are among the most active in Shanghai, and their programs are usually well received. One is the Shanghai Christian Broadcasting Station operated by Mrs. H. C. Robertson, an American woman. Its programs are almost exclusively religious, but music is interlarded with sermons. Because of the large number of missionary stations in all parts of the nation, some in the most outlying areas, and because of the comparatively large body of Chinese Christians, the programs of this station enjoy a larger audience than might be supposed. In addition the news broadcasts of this station, presented in English, are eagerly awaited by foreigners in isolated stations.

The other religious station is of a different nature. It is the Fo Yin station, and is operated by the Shanghai Buddhist Assocation. The organ of a section of Buddhists which believes in discarding the old tradition of tranquility and making an aggressive campaign for religion, this station reflects an evangelistic fervor comparable to that of many American Christian institutions. Music, impassioned orations, lessons and plays with a religious motive can be heard at almost all hours

[*Continued on page* 145]



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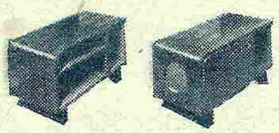

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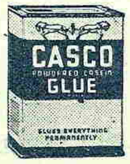

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Building "Flying Cloud"

[*Continued from page* 109]

Cloud will be able to do coastwise cruising almost anywhere. To consider an ocean crossing in this boat would be folly even though boats smaller than she have done these kind of voyages. This boat was designed as a comfortable cruiser and should be considered as such. Her cockpit is much too large to take to sea and her bottom is not strong enough to withstand the sort of punishment which such a voyage entails. There is no way to adapt this boat to such work but at some later date we will publish an enlarged edition of *Buddy* which will be specifically designed to follow the track of the *Hawkshaw,* a *Buddy* that poked her nose into such far places as Cuba and saw the coast of Yucatan over her taffrail. This boat will be the answer to the many letters of readers who had the yen to go off shore just as *Flying Cloud* is the answer to those desiring comfort to the more adventurous type of cruising.

The House That Death Built

[*Continued from page* 86]

Sarah Winchester, cloistered in supreme loneliness, died on September 5, 1922. The builders gathered up their tools, the great rambling structure gathered dust and age. But she left an astonishing heritage which, in summary form, looks like this:

160 rooms.
13 bathrooms.
47 fireplaces.
Thousands of windows and doors.
Five Tiffany windows costing $1,000 each.
A front door worth $2,000.
3 elevators.
40 stairways.
5 separate heating systems.
9 kitchens.
Transparent floors, screens on inside doors, doorknobs and fixtures of gold, silver and bronze.

One has the macabre realization that these rooms were made for spirit guests; that no human being was ever destined to sleep in the bedrooms of dazzling beauty, or sit down in any of the vast reception rooms, whose walls are covered with embossed wall paper studded with bits of crystal.

Sarah Winchester had a weakness for the number thirteen. All the stairways are constructed in series of 13 steps, walls have 13 panels, glass doors have 13 pieces, chandeliers have 13 lights. On one chandelier, having no room for a thirteenth light, Mrs. Winchester punched a hole in the gold conduit pipe and fastened therein a plain iron gas jet.

You can find dozens of closet doors that open on blank walls, stairways that end in mid-air, trap doors, blind chimneys, secret passages, screens placed on blank walls, doors with knobs on only one side. The house was so arranged that carriages or automobiles could be driven inside, with no prying eyes able to watch the silent widow step out.

The mansion is indeed a remarkable feat of the builders' art. For, although few of the rooms are on a level with one another, the structure stands solidly, rising to a maximum height of five stories in spots, stretching out like a village in others.

Sarah Winchester's burning zeal to "keep building" is reflected everywhere, particularly in one stairway, with 44 steps 2 inches high and seven turns in a total rise of only ten feet.

If you were taken to the center of the house and left there alone, it might easily take a day to find the way out.

Today, with Sarah Winchester but a memory, with the age-browned halls and rooms deserted shells of once busy hours, strange phenomena have aroused the countryside to a furore of gossip. The spirits, which must have followed the old woman to her marble tomb in New Haven, are once more flitting through the labyrinth . . .

Weird rappings filter down from above to the caretaker's room on the ground floor. Footsteps, soft, gentle, come and go through the night in padding cadence. Sibilant whispers, they say, swirl around your ears . . .

A woman who went through the house recently, said in hushed awe:

"Someone—some unseen guide—was at my side as I walked into Mrs. Winchester's room. Another time, I felt a gentle pressure on my arm. Superstitious? Not a bit. But I can't understand it. I could feel this invisible thing in every room."

Many other recent visitors have reported similar puzzling experiences, paralleling familiar psychic demonstrations in other parts of the world.

The late Harry Houdini, prince of magicians, went through the mansion in the dead of night some years ago but gave out no public impression of his visit. He had planned, however, to return and spend a week within its mystic walls.

Has Sarah Winchester come "home"?

What does it mean—the unearthly tramp-tramp of unseen feet, the eerie cry of voices from shadowy, cobwebbed eaves?

Who knows?

The dead leaves fall, the lonely trees bend to the wind, the blue mountain gazes down sphinx-like on the house where Sarah Winchester looked alone at her soul . . .

Herbs Grow In Kitchen

Many of the old-fashioned herbs that are used in seasoning dishes can be grown right in the kitchen window in flower boxes.

The Department of Agriculture says the best herbs to grow in a window are mint, watercress, parsley, rose geranium, chives, sweet marjoram and basil. The best soil for them is one-part sharp sand, one part well-rotted cow manure, two or three parts of good garden loam, and a little bone meal, all well mixed together.

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Stamp Collecting For Profit

[*Continued from page 32*]

65c, $1.30 and $2.60, a total of $4.55. Today selling prices on these three stamps total $48.00 in mint or used condition with few sets available at this price. Another value that increased tremendously is the 50c Zeppelin stamp issued during the Chicago World's Fair. In slightly over three years the price jumped to $4.00 for well-centered copies.

Another outstanding value is the 3c Bi-centennial issue. This was replaced by the present Washington stamp on June 16, 1932, after it had been on sale only a few months. Catalog price over face value has jumped 600%. Another stamp to watch is the Maryland Tercentenary issue released in 1934. This was printed in red instead of violet and was taken "off sale" in a short time because of confusion in some post offices.

It can readily be seen that careful study should be made of issues as they are released so that adequate copies may be secured before the philatelic agencies remove them from sale.

Other stamps issued by the United States during the last 10 years which have shown tremendous increases in value are Burgoyne Campaign issue released in 1927, increase 2000%; Valley Forge issue 1928, 750%; and "Molly Pitcher" overprint issue 1928, 900%. The Hawaiian commemorative issue of 1928 had two values. The 2c value has increased 1250% and the 5c value 1200%. A later example is the Bi-centennial issue released in 1932. This issue had 12 values from ½c to 10c.

Below is listed the percentage of increased values found as against face values for each:

½c	400%	5c	300%
1 c	500%	6c	335%
1½c	665%	7c	285%
2 c	250%	8c	275%
3 c	835%	9c	277%
4 c	300%	10c	400%

An outstanding example of popularity in recent issues is the "Farley Follies." At first dealers and collectors refrained from buying because they felt that something had been "put over on them." But soon after the issues were removed from sale at the Philatelic Agency in Washington, collectors and dealers realized that here was a set of issues which were bound to increase in value. Prices skyrocketed, and now it is almost impossible to secure a good set at less than $3.00.

Other U. S. issues which should receive intensive study and consideration are the air mails, parcel post issues, special delivery and revenues.

Another branch of philately which a collector should investigate is "covers." These are envelopes which have been postally used. They have a stamp affixed which is "tied" to the cover by a cancellation. Stamps should not be removed from "covers" until their value has been determined so affixed. Many valuable stamps have been discovered in old trunks in attics. Old correspondence sometimes contains "covers" of high value and careful search should be made to discover these rarities.

Practically the same possibilities for profit exist with issues from foreign countries if a collector will make a study of releases, quantities and condition of the stamps he purchases. This is of vital importance if the greatest profits are to be realized from investments in philately.

Next to the United States issues, perhaps the greatest possibilities for profit exist with Great Britain and Britisn Colonies. This monarchy and its colonies do not make it a practice to foist issues on dealers and collectors to fatten their treasury. It will be found that mint copies of these releases increase in value faster than do used copies.

The increased popularity of Great Britain and British Colonial stamps is especially noticeable in the Silver Jubilee issues released during 1935. In most cases these were bi-colored stamps of the large size which form a beautiful addition to any collection. These stamps were on sale only a short time and were soon exhausted. In two years' time most values have increased 300% to 500%.

On the subject of British Colonies, we find that the most popular are Australia, Canada, Newfoundland, New Zealand and Union of South Africa. Individual colonies in these dominions supply their own postal adhesives, so a collector will find the British Empire a fertile field for study and profit.

Another classification which demands study is "dead" countries—nations which have passed out of existence through conquest or absorption. Latest of these is Abyssinia, or Ethiopia, as we have learned to call it from newspaper reports.

In September, 1935, Italy invaded Ethiopia and by April, 1936, had conquered a territory approximately as large as the states of Texas and Oklahoma combined. Shortly after the successful campaign Premier Mussolini proclaimed Abyssinia to be part of Italy. New stamps have been issued to supplant those which were being used at the start of the conquest.

It is reported that at the time of fleeing from Ethiopia, Emperor Haile Selassie took with him all available stamps which had not been sent out to the various post offices. This is one country on which a collector-for-profit may safely make an investment, because values are bound to rise.

Other countries which deserve attention from collectors are Armenia, Bosnia and Herzegovina, Cameroons Africa, Cape of Good Hope, Carinthia Caroline Islands, Corea, Crete, Danish West Indies, Fiume, Georgia, German East Africa, Mariana Islands, Natal, Orange River Colony, Palestine, Penrhyn Island, Philippine Islands (under jurisdiction of U. S.) Prussia, Rio de Oro, Saar, Spain (prior to 1931) Togo, Transvaal, Upper Volta, Vatican City (stamps containing pictures of Pope Pius XI), Victoria, Western Australia, Wurtemburg and Zambesia.

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South To Mexico

[*Continued from page* 43]

for cars without good gears and brakes and it is the last place on earth for a careless driver. It is no road for night driving and never will be, for the night fogs would prevent even the best driver dodging a mountain slide, visible and easily avoided by day. Most important, a night rider would miss the grandeur of the scenery, with its breath-taking panoramas at every turn. The five hours necessary for these 64 miles are probably the most worth while of the entire trip.

While this stretch of hairpin turns is being paved as rapidly as possible, much of the road is still flinty rock that will tear new tires to shreds at speeds greater than 15 miles an hour. This is another reason why all your tires should be in perfect condition when you set out.

After leaving Jacala you climb 2,000 feet higher through magnificent mountains. This stretch has been freshly paved and can be covered at 30 miles an hour—if you don't care for scenery. After 40 miles of this, you enter the Hacienda country, the land of large plantations. The rest of the trip is over a high, level table-land.

It is important that the car be in good condition before setting out. Good mechanics and spare parts will be found in Monterrey and Mexico City, but will be mighty scarce on the long stretches in between. Tires, tubes and parts cost about double in Mexico owing to high import duties. Gasoline averages about 23 cents a gallon, and is sold by the liter, 3.8 liters equalling one gallon. There are fewer service stations along the route than on most main highways in the United States, but the number will increase quickly as travel becomes heavier. Oil stations are 25 miles apart or more. Hotel, tourist camp and eating places are reasonable and excellent. At least ten places along the route have hotel accommodations now, and there are new "tourist courts" at two or three points, the beginning of a chain. The most famous is at Monterrey, and resembles a little Mexican city in itself. A boom town along the way is Villa Jaurez, which boasts of a hotel with 40 rooms and 40 shower baths, besides other small hostelries.

Traffic signs, of course, are in Spanish. Speed limits are posted in kilometers, a kilometer being five-eighths of a mile. The sign reading *Velocida Maxima—80* means that the speed limit is 50 miles per hour. In towns the speed limit is 25. The peso is the monetary unit, worth about 28 cents in American currency. Prices are posted in Mexican money, using the familiar dollar sign. Don't be shocked if the hotel asks $10 for a room—that's only $2.80 in Yankee money.

Other pointers for autoists Mexico-bound include the simple advice of taking along identification papers, such as tax receipts or auto club cards, to prove legal residence in the United States. Naturalized citizens should carry their papers and aliens their passports. Since it is illegal to use foreign money in Mexico, currency should be exchanged at the border, or travellers' checks should be carried. These details all can be handled at the border within an hour.

Since the only good motor roads in Mexico are the Pan-American Highway and roads radiating from Mexico City, the trip must start at Laredo. Immediately after crossing the International Bridge you must stop at the Customs for baggage inspection. There your baggage will be sealed and the seals must not be broken until the two Custom Inspection Stations, 14 miles and 108 miles to the south, have been passed.

The road to Mexico City is really only the first link in the highway that eventually will enable you to motor to South America. Each Government is constructing its own part of the road as fast as its funds will permit. Links of varying lengths have been built in all the countries in Central and South America and these will be connected gradually to form one continuous highway rolling down to Rio along the Atlantic side, down to Buenos Aires, in the Argentine, spanning the mighty Andes to Santiago, Chile, and turning back north along the Pacific up through Peru.

The impetus for completion of this fascinating loop around South America will come from the North as American tourists pave the way with their money. Mexican travel authorities expect each American to spend $70 each, a figure based on the $100,000,000 a year Americans have spent to hop in the family car and "go abroad" to Canada. Mexico could use some of that spare change—and thinks she'll get it now.

Lost City Vanishes Again

Ruins of Nevada's Lost City, which archaeologists had hastily explored before Boulder Dam swallowed them forever, have vanished under waters of the great lake behind the dam.

Archaeologists, however, salvaged much of the story buried in the sand, showing that prehistoric America once had a flourishing town where twentieth century America has raised a gigantic engineering project.

National Park Service archaeologists, aided by CCC men, worked against time to uncover graves, adobe houses, and hidden relics of the ancient inhabitants. People of the Lost City are identified as Pueblo Indians who lived about 1,500 years ago. Their settlement in an oasis of the Nevada desert was so extensive that excavators have found ruins spreading along the Muddy River for nearly five miles. When the ancient people abandoned the city, sand dunes buried it so deeply that it lay forgotten until recent years.

Relics from the Lost City include artistic pottery, shell and turquoise ornaments, broken clay dolls, paints, arrow and spear points. These are to be preserved in the museum at Overton, Nevada, and in the Southwest Museum, which has directed much of the work at the site.

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New Orleans' Flood Bowl

[*Continued from page* 47]

ranging from 600 to 1,200 horsepower. This dependency upon a central power plant is the only weakness in the system, but so far current failures have been of briefest duration, and the system has never been shut off long enough for any extensive damage to be done by the ever-menacing floods.

Before 1900 a large section of the present city of New Orleans was uninhabitable entirely, and the rest of the city was kept dry in a haphazard manner by means of primitive drainage canals, with pumping stations equipped simply with huge paddle wheels, such as those used on stern-wheeled river boats, operated by steam. For many years these clumsy, inefficient paddle wheels, churning the water in the canals, constituted the city's only protection against the constantly overflowing Missisppippi. The yearly damage during these years of inadequate protection ran into enormous figures, and the flood waters claimed lives as well as property.

After the propeller pumps were installed a new problem arose. The blades were constantly being clogged by trash and debris of all sorts that kept flowing through the miles of canals, much of it being fallen branches of trees and weeds from the banks of the unprotected canals. Crews of men were constantly employed to keep the canal banks cleared, and thousands of dollars were expended to line the banks of the main arteries. An improved pump was designed by the city engineers in which the propellers were placed above the water-line, instead of beneath it, vacuum pumps sucking out the air between the propeller blades and the water, and with electrically-operated trash-cutters preventing the water from carrying the refuse and trash up to the blades.

Each station operates its own controls with a switchboard, and is independent of the other stations—there is no central plant.

If huge Lake Pontchartrain and the gigantic Mississippi were both to begin emptying themselves into the bowl-bottom that is New Orleans, a dozen men at the control board of the half-dozen quiet-looking pumping stations could drain the city dry as fast as the floods poured in.

Bighorns Vanishing In U. S.

Mountain sheep, or Bighorn, are giving conservationists plenty to worry about these days. They never were particularly abundant, and their magnificently horned heads have been prime trophies for sportsmen ever since white men went into the West. Now the little band in California is perilously close to the vanishing point, and there is no assurance that the larger groups in the Rockies are increasing, or even holding their own. Only in British Columbia and Alaska, where there are far fewer hunters to molest them, do the Bighorn seem to be thriving.

Circus Inspires Hobbies

[*Continued from page* 54]

years, has made up in the dressing tents of 22 circuses, from the greatest show on earth down to the smallest of one-ring outfits.

Even more earnest in following such a hobby is Frank J. Walter, Houston, Texas, financier, who actually risks his life quite often to satisfy his hobby. Young Walter's interest in animals began as a school lad with a bear cub a friend sent him. He taught it tricks, learned more about animal training from the zoo keeper in his home town, and started a collection of animals.

Now his handsome estate has all the appearance of a winter quarters with four score trained horses, ponies and mules, a lion, a leopard, a high wire walking goat, several dogs and monkeys, a sacred cow and a herd of Alaskan deer.

Walter, with the assistance of his attractive wife, operates a one-ring animal circus solely for the entertainment, in Houston parks and playgrounds, of underprivileged and crippled children. And the Walters provide plenty of lemonade and peanuts to make the event a complete success.

Several times Walter has sustained painful injuries pursuing his animal training hobby. Once his fighting lioness sank her teeth in his left arm and refused to turn loose. The nerves were paralyzed and it was more than a year before Walter regained use of the member.

Now his hobby is expanding as he adds to his collection of animals, circus wagons of historical value. In the group are a score of gilded cages, tableau wagons, caliopes, clown police patrol, and band wagons. Most cherished of his possessions is a 50-year-old band wagon of the old Barnum and Bailey circus, which he discovered in a Sweetwater, Texas, warehouse, and the original Gentry Brothers ticket wagon, built in the early 80's.

Mechanically inclined circus fans find model building their forte. One of the foremost model circus builders is Joseph W. Taggert, Rockford, Illinois, jeweler, who has constructed a complete scale model of Ringling Brothers-Barnum and Bailey circus. Scaled one-half inch to the foot, the replica is complete from folding grandstand chairs the size of postage stamps, to the pea-sized blocks which hold the tiny aerial rigging in place.

The model show contains 14,000 pieces, required five years to build, and all equipment loads into handsome model wagons which best demonstrate his art. His reproduction of the famous Barnum and Bailey two-hemisphere band wagon is 20 inches long, eight inches wide and ten inches high, contains 10 pounds of gold leaf, required 2,000 hours to construct and is complete to the minutest detail of the seals of all nations which ornament it.

George H. Barlow, III, a Binghamton, New York, real estate operator, builds remarkably clever miniature tents, with every detail from

[*Continued on page* 142]

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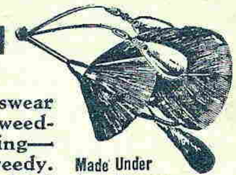

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A Midget Front-Drive Racer

[*Continued from page* 101]

gauge sheet aluminum is riveted in for the bottom of the seat.

The exact dimensions and location of the motor mounting lugs will depend on the type of motor installed and whether you use a transmission. They should be so located that, when the motor is in place, a gear on the end of the clutch tail shaft will engage with an internal gear on the end of the differential shaft. This arrangement is used when a transmission is not employed.

The front springs consist of three leaves each, ¼″ thick and 1½″ wide. The eyes in the front ends are turned down, bushed and reamed to ½″ so they will fit Model "T" Ford front spring shackles. Attach the springs to the mounts with ½″ bolts.

Make the rear springs from 3/16″ x 1¼″ stock. Turn the eyes down, and bush them for ½″ shackles. In mounting the springs, use a hardwood filler block inside the mount, and ½″ S. A. E. bolts.

Differential brackets may be cast from aluminum, bronze, or steel. Bolt them to the side rails with 5/16″ bolts, 3½″ long.

The front axle castings, or steering-heads, are of nickeladium steel, heat-treated. Bronze bushings, with a bore of 9/16″, are inserted to act as bearings for the king-bolts. The axle itself is of 11 gauge steel tubing, 1½″ diameter and 32″ long, bent in the center so that point will be 5″ forward of the kingbolts. The ends of the tube are welded inside the bore of the castings. It is very important that you get the castings lined up correctly. One way to do this is to let the arms carrying the bushings rest on a flat surface while the welding is being done.

Front spring hangers are made by cutting off the front spring eyes of a "T" Ford, and welding them to the underside of the front axle. Some sort of jig must be used to hold them in alignment while being welded. A good way to do it is to slip both hangers on a ½″ tube about two feet long, and space them the right distance apart to fit the spring eyes. Place the axle on a flat surface, with the bent part pointing up, and clamp the tube in some manner so that its center is 4¾″ above the surface on which the axle is resting, and the hangers touching the axle. See that the hangers are equidistant from the center of the axle, and after welding them in place, withdraw the tube. No doubt, you can figure out ways to locate them accurately, but this method is about as simple as any.

Front spindle bodies, or steering knuckles, are cast from "nickeladium" steel, heat-treated. The top and bottom ends are drilled and tapped to take the king-bolts, which are "T" Ford tie-rod bolts, cut off at the lower end, and locked in place with set screws as indicated.

Turn the steering arms from "T" Ford axle shaft stock. After milling down the portions indicated, and drilling the holes, heat and bend them to shape. They are, then heat-treated. In addition to being bent down, the arms must also be bent to converge toward the rear, as in the top view of the chassis.

Make the tie-rod from a "T" Ford drag link, lengthened to 35½" from center to center of the ball sockets by piecing it with a length of steel tube, welded in place. Use "fish-mouth" joints about 2" long to prevent the welds from being in tension. The bolts on either side of the ball sockets must be in line with those on the opposite end of the rod.

Turn the front spindle shafts from chrome-vanadium steel. Electric-weld a Austin universal joint or a Spicer Mfg. Co. replacement joint to the flange on the shaft after cutting off the short splined part so the flange on the "U" joint butts against the one on the spindle shaft. Use the pilot shoulder on the shaft to center the joint.

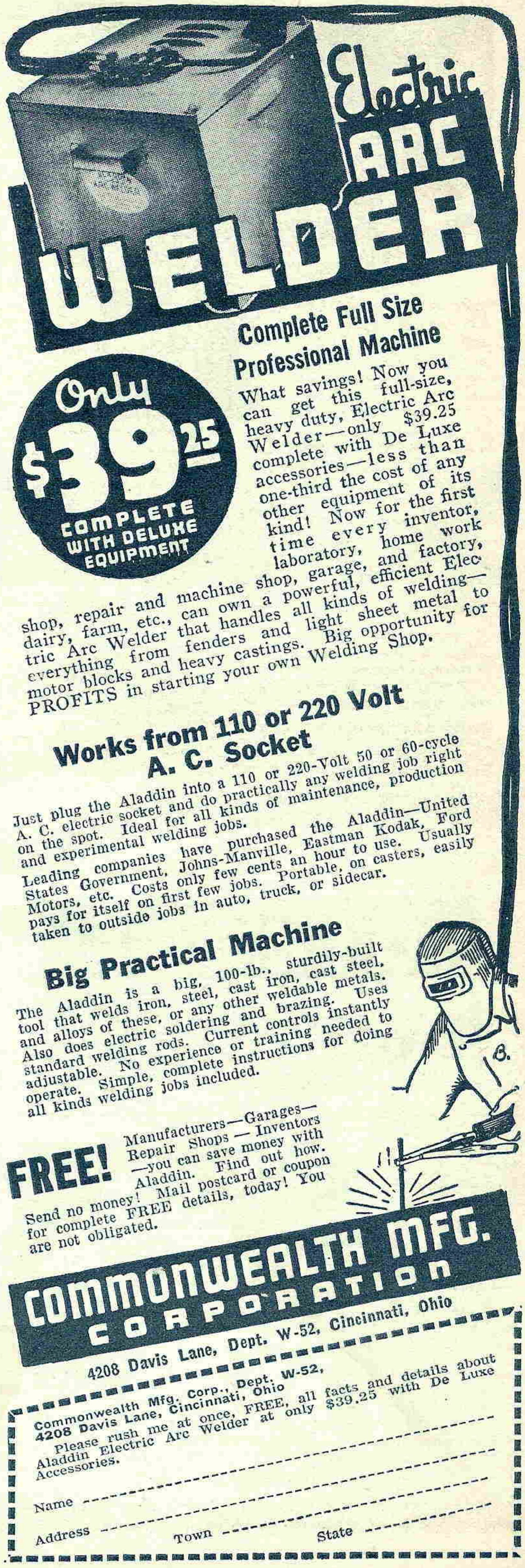
Now fit the Timken taper bearing, No. 07204 cup and No. 07098 cone, on which the shaft turns.

Both front and rear hubs are alike, cast from A. L.-40 steel, heat-treated. This applies also to the wheel lock-nuts. Hubs turn on a Timken taper bearing, No. 14276 cup and No. 14138 conel.

Next comes the differential. Take one from a Model "T" Ford and cut off the housing to the proper length. Turn the ends down to 2¾" diameter so they fit the brackets. Remove the regular ring and pinion gears and replace them with a 39-tooth ring gear and a 12-tooth pinion, giving a ratio of 3¼ to one. Remove the tubing from the ends of the housing, and enlarge the bore to 2.438" to fit No. 1206 New Departure ball bearings. Replace the axle shafts with the short ones shown in the plans. The splined sleeve on the end is made by removing the teeth from a 1926 Studebaker axle gear (8-spline), and is welded to the shaft. Use felt packing to space the bearings. The short pinion shaft, which replaces the Ford propeller shaft, is made from an AA Ford coupler shaft, part No. AA-4815-B, which has an internal gear on one end. As mentioned before, you will fit a gear to match it on the end of the clutch tail shaft—that is, when you don't use a transmission. If you do use one, this detail is altered accordingly. Bore out the propeller-shaft bearing collar to fit No 1206 New Departure ball bearings and shorten it to fit your pinion shaft, on which the bearings are spaced with steel washers. Be sure to leave enough shoulder on the collar to take the end thrust of the shaft.

The two coupler shafts are made from 1926 Studebaker 8-spline axle shafts, cut to length. Allow 1" of the splines to fit the ones on the short shafts in the differential. Turn down the other end of the coupler shafts to 1" diameter, and spline it to fit the Austin universal joint. The splines at both ends must be rounded off enough to allow a ¾" swing, either way, at the outer end of the coupler shaft, which will take care of any deflection due to spring action or steering.

[*Continued in July Issue*]



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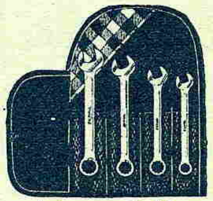

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Circus Inspires Hobbies

[*Continued from page* 139]

sweep band to ball ring. John R. Shepard, Chicago miller, has a miniature menagerie containing 236 species of animals, many of them his own handiwork, carved with a penknife. Walter Matthie, a Long Beach, California, school boy, has modeled the Al G. Barnes Circus, and Dr. Hugh Grant Rowell, Columbia University professor, has preserved the Hagenbeck-Wallace Circus in scale model handcraft.

One ardent fan even attributes his longevity of life to his interest in the circus. He is Irving K. Pond, Chicago architect, who designed Hull House and Chicago Commons and served as president of the American Institute of Architecture.

When he observed his 77th birthday last May, he demonstrated his physical prowess by executing a dozen backward and forward somersaults, just as he had done on every birthday since he was a youngster.

From the time he saw his first circus at five, he was an ardent fan. At 10, he accomplished a forward somersault; at 12, a backward flip. In college, he made the first touchdown in an intercollegiate football game west of the Allegheny mountains in 1879.

His somersaults today, he says, show much better form than 50 years ago, for in half a century he has met and known intimately the foremost tumblers of the world and has written a book, "The Art of the Circus," dealing with acrobatic feats.

Creating the Spectaculars

[*Continued from page* 61]

to sell a sign. The real headache is the problem of financing."

The rental fee includes everything—building and erection of the sign, inspection, repairs, rental of the site, electricity, etc. A crew of thirty is required to erect a new sign. Another corps of inspectors makes hourly rounds from sign to sign, replacing burnt-out bulbs and making sure the complicated electrical switches function perfectly. When a bulb burns out, as it does once a year on the average, it is replaced within a few minutes while the sign is in operation.

The more elaborate "animations" of a spectacular are achieved with ordinary electric bulbs, while neon lighting is used more largely for borders, trade names, streaks of color, and the like. Bulbs are more flexible in painting action pictures and produce scenes of every graduation of color by use of glass stained to the desired shade. An animation is any individual bit of action—stars flickering, candles burning, words flashing on and off, etc. One of Mr. Leigh's signs in Columbus Circle has fourteen animations, more than any other sign in the world.

When a sketch for a sign has been approved, the animations and color combinations are carefully indicated on the drawings. Blueprints must be made for the electricians to devise the wiring hook-up which will activate the units of the sign in proper sequence. The sign itself is built in a workshop with plenty of floor space where its gigantic sections can be laid out. One small portion of a spectacular may be large enough to fill a five-ton truck.

Each new sign is a custom-built job into which mass production methods cannot enter. Sheet steel is used for many sections of the sign and there is a special machine for punching light-socket holes through the metal.

A steel framework, constructed just like the riveted skeleton of a skyscraper, is the base on which the sign is mounted as the various sections come from the shop. Often the steel girders are several stories high, mounted on the roof of a building. Sites for displays are at a premium in congested districts like Times Square and property owners are well aware of the value of their property for such purposes. Therefore the sign manufacturer leases choice locations on his own initiative, erects his steel framework, and then sets out to sell a sign for that particular location. The steelwork is of course permanent, and when one sign has lived its life it is taken down, a few parts salvaged, and a new spectacular goes up in its place.

The electric brain of a spectacular sign is a marvelously intricate mechanism. It is housed in a small structure at the base of the steel framework. Switches, fuses, and contact devices abound in the complex profusion one would expect to find in a telephone exchange. Cables lead out to various portions of the sign and over them, at split-second intervals, flash the accurately timed signals which co-ordinate the thousands of bulbs into a perfect moving picture. Contacts are made by cams on a long revolving rod, which depress levers at the proper intervals and send current flowing through the sign.

Not satisfied with the effects produced by a single arrangement of bulbs, the sign designer makes wide use of "overlays." An overlay consists of bulbs which flash out two or more messages in the same space. Viewed in daylight, they appear very much as if a printer had stamped two sets of words one over the other. By night, of course, when only one sentence is illuminated at a time, the separate messages are spelled out distinctly.

A spectacular is regarded as a sign with more than 200 feet of neon tubing or electric bulbs. Other large signs which don't quite meet these specifications are spoken of as "semi-spectaculars." You will never discover a spectacular in which more than 35 per cent of the framework is occupied by the sign itself. Building regulations forbid it. The reason is obvious, since some of the high winds which howl down Gotham's canyons, striking a flat surface as large as an office building, could hurl the stoutest steel frame-

[*Continued on page* 144]

BIG MUSCLES — SMASHING STRENGTH GLOWING HEALTH!

I'll Prove in the first 7 days — that I can Make You a New Man!

DO YOU want big, smashing, sledge-hammer muscles all over your body? Husky, broad shoulders? Deep, powerful chest? All the pep and vigor of a "hard as nails" athlete? Give me just 7 days—one short week. I'll give you the PROOF that I can make you a *new man*—with a real he-man build, glowing health that resists sickness, ends pimples, skin blemishes, constipation, other troubles.

Read the reports below. That's the kind of RESULTS *you* can get with my discovery—*Dynamic-Tension.* My Free Book, "Everlasting Health and Strength," tells how I can give YOU a body women admire and men envy.

The 97-lb. Weakling Who Became "The World's Most Perfectly Developed Man"

This new photo is *exactly* how I look today. Yet once *I* was a 97-lb. weakling! Timid, self-conscious—never had good times. Then I discovered the secret of my *Dynamic Tension* method of body building. It changed my entire life. It has twice won me the title, "The World's Most Perfectly Developed Man"! And what my amazing system did for *me*—what it has done for hundreds of *other* fellows like yourself—it can now do for YOU, too!

I back up that promise with *quick* RESULTS. You begin to SEE and FEEL the difference at once. What's more, it's actual *fun* to build a husky body my *Dynamic Tension* way, at home, in just a few minutes daily. And you don't have to buy any contraptions that might strain your heart or other organs.

Mail Coupon for My Big 48-Page Book—FREE!

Make me prove in just 7 days that I CAN give you the big, smashing muscles—powerful shoulders—deep chest—all 'round health you have always wanted. Mail coupon for FREE copy of my big Book, "Everlasting Health and Strength." Address me personally. I'll send it by return mail. Show me you're a man of action. Do it NOW!

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Dept. M-67, CHICAGO, ILL.

GIVEN!
$6 Double-blade Paddle now given with your KI-YAK—**if you hurry!**

Creating the Spectaculars

[*Continued from page* 143]

work hundreds of feet to the street below with frightful damage.

"Red is the only type of neon that is any good for daylight signs," Mr. Leigh explained. "Daytime signs call for an entirely different design technique from those intended for night-time use."

The vastness of a spectacular sign staggers the imagination. A single letter in a word is often twice the height of a man. Elevated to positions often more than a hundred feet above the street, the spectator rarely realizes the immensity of the display.

Nowhere in the world can be found a more brilliant exhibition of spectacular signs than in New York's Times square district. Every moviegoer is familiar with the blazing signs on Broadway above Forty-second street which directors insert in their dramas whenever New York atmosphere is called for.

For years Broadway has been famous as the Gay White Way, but it is blushingly changing its complexion from white to rosy red as young Mr. Leigh and others of his unique profession work their miracles in electric bulbs and neon tubing.

Hammered Aluminum Ware

[*Continued from page* 122]

bent edge of a piece of sandpaper. This applies particularly to gouge shaped tools.

When the design is finished it is wiped with a rag soaked in lamp-black and oil and then wiped clean. The black, left in the engraved lines, shows up the design in silhouette against the aluminum. Slips of the tool which may occur can be cut out with a small chisel tool and rubbed out with steel wool.

At completion the bowl is washed in turpentine, then soapy water and finally given a light polish with chamois.

Hammered aluminum ware has the advantage of pewter without its weight and the brilliancy of satin finished silver without the tendency to tarnish. In fact, it keeps bright and clean, even out in the weather, for long periods of time. Moreover, it is extremely light and will stand rough handling without kinking or bending out of shape. It appears to be ideal material for the metal craftsman and its future as a craft material is unquestioned.

China's growing interest in modern medicines is balanced by a falling off of trade in such old Chinese remedies as deer horn.

Fire scenes in the movies can be kept cool by a chemical trick of combining inflammable and non-inflammable substances.

China's Millions Twist Dials

[*Continued from page* 131]

of the day or night, and the station is among the best known in China.

Mass education activities in Hopei province also make wide use of the radio. Conforming to orders of the Ministry of Education, radio sets have been installed in all middle schools of Hopei province, and programs of the mass-education movement are sent out from several government-owned stations simultaneously. In its campaign to educate adults as well as children and to make the masses literate, the Ministry of Education plans an increasing use of the ether waves.

Recently the Chinese Government ordered all stations in China to pick up a broadcast from XGOA at Nanking between 8 and 8:30 o'clock every night and to re-broadcast it. The program, it was announced, would consist of good music, talks, and news announcements in both English and Chinese. A howl immediately arose from operators of stations in Shanghai, particularly the foreign-owned stations, who resent the surrender of one of their best broadcasting periods to the Government. Although the Chinese stations objected also, they quickly complied with the Government order, but the foreign stations showed a disposition to resist. Finally, however, all except two, an American and a French station, decided to comply. The Government is still attempting to reach an amicable agreement with the two defiant stations which will result in their following the example of their colleagues.

Microphones Test Watches

An electric "stethoscope" which listens to the beats of watches and registers on a visible dial whether the watch being examined is running fast or slow, is described in a patent (No. 2,050,866) granted here to R. Tamm, of Berlin, Germany.

The stethoscope is designed to do away with the present time consuming method of testing watches, which sometimes involves many adjustments and a week or more before a high degree of accuracy is obtained.

By means of two microphones, one of which is placed over the standard watch known to be accurate, and the other over the watch to be tested, the stethoscope listens to the watch ticks. Picked up by the microphones, the beats are amplified and set up corresponding fluctuations in an electric system which acts as an analyzer.

If the deflection of the needle in the device increases as shown by a dial, it indicates the watch under test is running fast or gaining time. If it decreases, the watch is running slow.

Big advantage of the stethoscope is that adjustments can be made in a few minutes, whereas conventional testing may require 24 hours or more.

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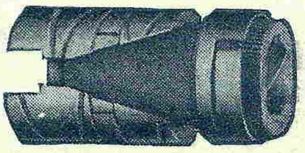
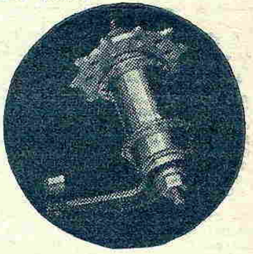
CONTEST CLOSES JULY 15TH





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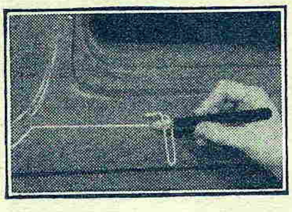

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Inflated Seats For Planes

Airplane seats that are probably more than 90 per cent air in bulk are the newest invention for aeronautical science, it is revealed in a patent granted to F. G. Manson of Dayton, Ohio.

The patent is for an airplane seat which looks like an overstuffed living room chair. However, no wood, steel or stuffings enter into its construction; only air-proof, rubberized fabrics that can be inflated.

By controlling the amount of inflation, the softness of the seat and also its height can be regulated.

The inflated seats, claims the inventor, would aid in keeping an airplane afloat in event of a forced landing on water. Moreover, the pneumatic seats would act as a "crash pad" or cushion to absorb the shock of impact should the plane fall suddenly, "pancake," or crash.

The air cells in the airplane seats are independent and inflated separately so that if one is accidently punctured or developed a leak, the seat will not collapse.

X-rays Aid Poison Studies

X-rays being used by Prof. G. F. McLeod of Cornell University, here, to get exact data on how poison sprays containing sulphur behave as they stick to leaves, and what becomes of the sulphur after the marauding insect or caterpillar has bitten out and swallowed some appetizing but lethal green pieces.

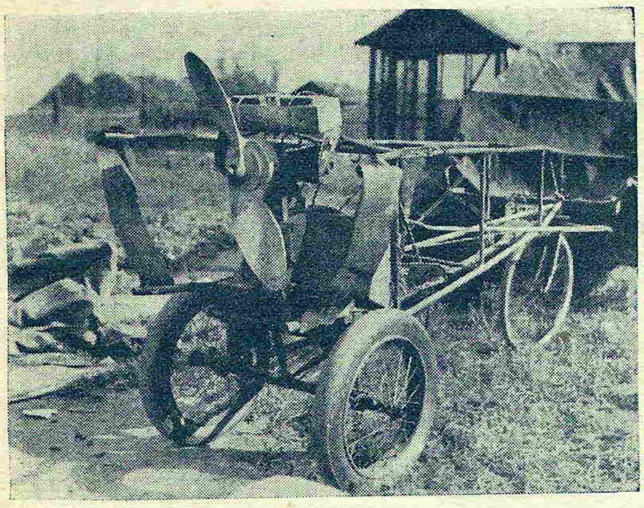
The rays used in the photography are of the kind known as Grenz rays; they are like X-rays but have somewhat greater wave-lengths, intermediate between X-ray and ultra-violet. Photographs taken by Prof. McLeod bring out plainly the distribution of the sulphur particles on the leaves, and show the round pellets of food as they travel through the digestive tracts of caterpillars.

Eye Sees Millionth Of Inch

The next time you see a film of oil on a rain puddle in the pavement look for the colored light fringes. Pretty. Yes. But, more important, they indicate that your eye can detect a difference of one millionth of an inch. That is the thickness of the oil films which produce those colors by interference. The beautiful coloring of some butterfly wings is a similar phenomenon of thin films. The best micrometer gauges now in use will detect differences of only one ten-thousandth of an inch.

A baby usually doubles his weight at birth by the time he is five or six months old and trebles it by the end of the first year.

Builds Air-Powered Tricycle



Rear view of the air-powered tricycle built by a youth of Fairbanks, Alaska, from parts of wrecked airplanes. Machine is capable of attaining speed of 15 miles an hour. In winter, skis replace wheels.

A DISCARDED airplane dolly, an old bicycle wheel and some wrecked airplane parts have been converted into an air-powered tricycle for travel over wild interior roads of Alaska.

The body of the eight-foot vehicle is formed from the rear part of an airplane fuselage, the frame work remaining open to permit full vision. A rubber-tired airplane dolly provides the rear wheels. A single bicycle wheel, mounted to run in reverse, is used in front. In place of the conventional steering mechanism, a joy-stick is used to control the right and left turns of the unique vehicle. A one-place cockpit for the driver is built into the fuselage.

An old two-cylinder airplane motor and a small aluminum propeller are mounted directly behind the driver. The spinning propeller is covered by screening to prevent possible injury to pedestrians.

The Quetta nectarine from India is adapting itself to commercial growing in California, and should ripen successfully as far north as Iowa and Pennsylvania.

There are 80,000 Indian children being educated in Federal, mission, and public schools in the United States.

A tuberculosis center with 1,400 beds is to be built in Buenos Aires, Argentina, at a cost of almost $2,000,000.

Most animals that climb trees descend tail first, but a few kinds, such as squirrels and chipmunks, climb down head first.

You can't just "rinse" rust out of a radiator...IT TAKES A PROFESSIONAL JOB!

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Prizes For Big Air Race

Probably the most spectacular air race ever to be held is scheduled for August of this year with the whole breadth of the Atlantic, from New York to Paris, as the speed course. The race will mark the 10th anniversary of Lindbergh's historic flight which took place May 20-21, 1927. Under the sponsorship of the Aero Club of France, with prize money donated by the Air Ministry of France, the supervision of the race at this end will be in the hands of the National Aeronautic Association, of Washington, D. C. The complete regulations are published in the February issue of The National Aeronautic Magazine, official organ of this Association.

Prize money will amount to 3,000,000 francs (about $140,100) and has been posted by Pierre Cot, the French Air Minister. The first place winner will get $70,050; second, $46,700, and third, $23,350.

Regulations were finally promulgated after several months of correspondence between the Aero Club of France and the National Aeronautic Association.

The two important features of the regulations are:

(1) That the race will be run in August, each contestant being permitted to start at any time during the month. In other words, it will be a race against time rather than a race among pilots.

(2) Only multi-motored aircraft will be permitted to enter, each equipped with two-way radio.

The contest is open to citizens of the 35 countries affiliated with the Federation Aeronautique Internationale. These include the major nations of the world.

'Quake Shuts Water Valves

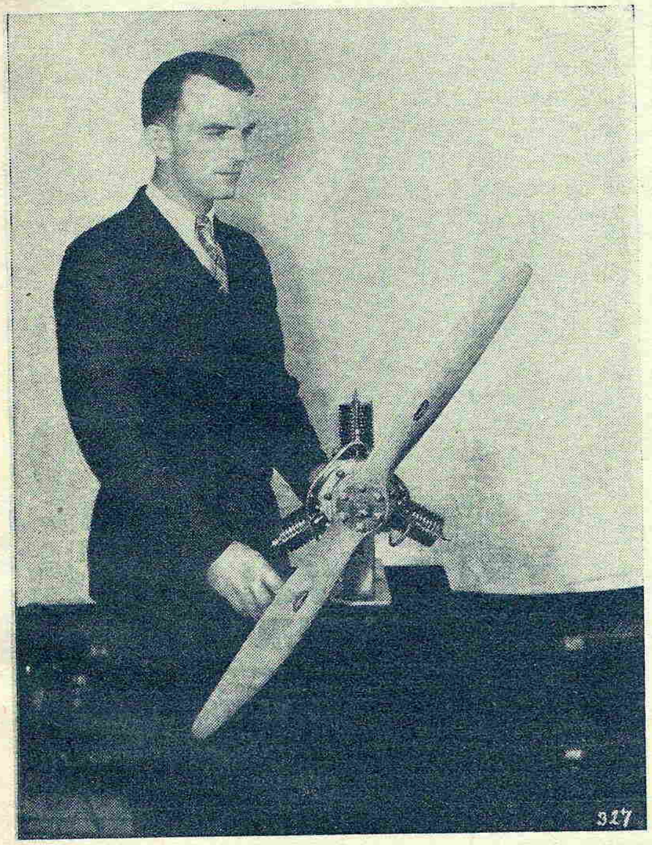
No more would earthquakes be accompanied by water spouting from bursted mains and flaming gas hissing from sheared pipes, according to a patent granted to S. H. Hansen, of Berkeley, Calif., for an earthquake actuated valve.

The valve is intended to shut off automatically flow of fluids through the mains at the first earth tremor. Most essential element of the device is a clock-like pendulum which is free to swing, no matter from which direction the earthquake shock comes.

The pendulum is connected to a latch mechanism which normally keeps the valve open. When set swinging by a 'quake, the pendulum trips the latch mechanism, thereby automatically causing the valve to close.

German scientists are attempting to bring back the extinct ancestor of all European cattle, the aurochs, by breeding experiments with living wild cattle.

Diesel Aircraft Motor Weighs 18 Pounds



Weighing only eighteen pounds and capable of developing up to six horsepower, this midget Diesel motor is the smallest radial engine of this type ever to be developed. It is pictured here with its inventor, Charles Keene, a Los Angeles engineer.

CREDIT for building the world's smallest Diesel type airplane engine is claimed by Charles Keene, a Los Angeles engineer. The tiny motor is a three-cylinder, two-cycle, radial type capable of developing more than six horsepower. While not large enough for actual aircraft application, the motor, according to its inventor, can be proportionately increased in size for use in planes.

The engine is no larger in size than the familiar outboard motor and operates on an ingenious fuel injection system. Three-ounce pistons with a one and seven-eighths inch stroke result in more than average power for a motor of this size. Tests revealed that the motor operates under a compression of four hundred and sixty pounds per square inch with a ratio of sixteen to one.

First proof that a plant virus disease could be transmitted by an insect was obtained with the Japanese stunt disease of rice.

A Franciscan expedition digging on top of Mount Nebo has found a fourth century Christian church that once stood on the famous Bible site.

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Hardship Prolongs Life

Hardship in youth is a good thing—for some of the lower animals at least. Half-fed through their infancy, cladocera, or water-fleas, live longer and more vigorously after they have passed what is for them middle life, experiments by Dr. Lester Ingle and Prof. A. M. Banta of Brown University, have shown.

Cladocera are not fleas, though they do live in the water. They are really crustacea—minute relatives of lobsters, crabs, and crayfishes. They are particularly well adapted to biological experimentation, because they are perfectly content to live in bottles on laboratory shelves. Requiring very little room per individual, they can be studied in statistically significant numbers at very little expense.

"The essence of Dr. Ingle's results is that limitation in quantity of food keeps the cladocera in a youthful condition," Prof, Banta said, "so that when they are well fed in later life, beginning at a time when most of the animals have 'lived rapidly' on abundance of food and have already died, these previously semi-fed animals assume rapid rates of growth and reproduction. In a way, their active life is just beginning. They are still young animals.

"As judged by the effects upon longevity, the most favorable period for the 'abundant life' is not during the earlier part of life, but at a later period when possibly the body of the organism is better able to withstand the effects of a fairly rapid dissipation of vital energy," Dr. Ingle said. "Suffice it to say that any and all of the functions of the body, because of their utilization of vital energy, are factors in determining the life-span.

"The prolongation of the period of youth is perhaps, after all, not merely a vague dream, but quite possibly may have a basis for realization in temperate living, resulting in the moderate dissipation of vital energy."

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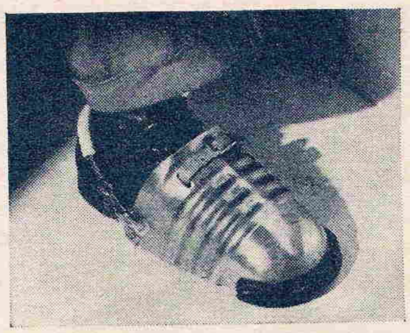

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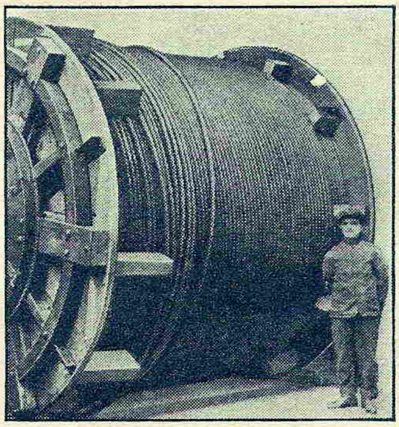

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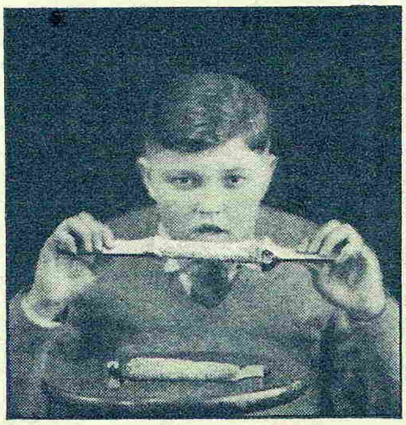

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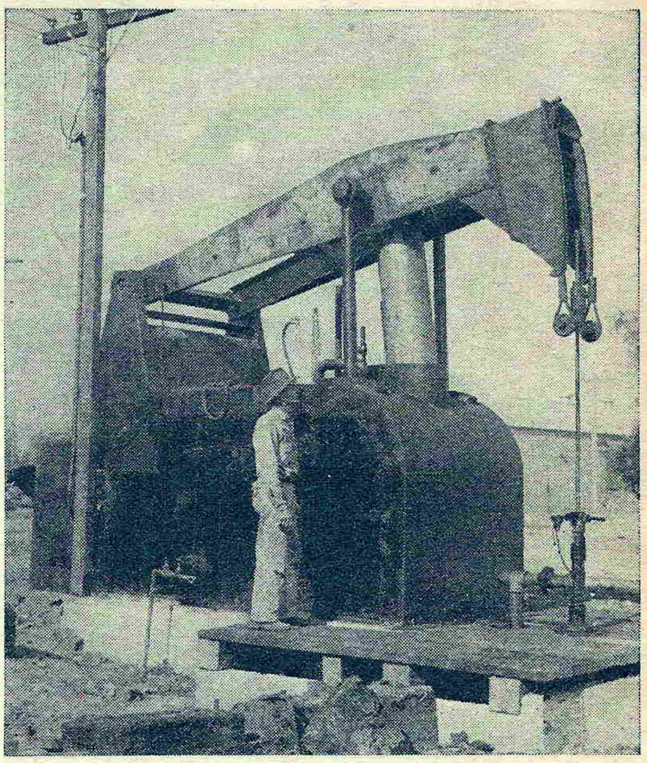
Replaces Old Oil Derricks



C. L. Hurt, superintendent of the Los Angeles Oil Fields, demonstrates one of the new hydraulicly operated oil derricks which are expected to replace the older type within city limits.

OIL derricks in many of the old and rich oil fields within the city limits of Los Angeles are being replaced by new equipment giving silent pumping operation, in addition to eliminating the unsightliness of the older type derricks.

Patent Safety Air Cushions

Airplane passengers would be literally strapped to their seats by air rather than by safety belts when the plane goes over the "bumps" according to the intended purpose of a new "Safety Chair for Airplanes," for which a patent has been granted to A. B. Scott and E. Goulding, of Los Angeles, Calif.

The "air straps," which would prevent the passenger from shifting and lurching out of his seat when the plane makes sudden turns or drops, are two inflatable cushions attached to each side of the chair near the side arms.

The passenger sits down between them. Then, on the mere turn of a valve, air from compressed-air storage tanks blows up the cushions. As they are inflated, the cushions mold themselves around the thighs of the passenger in such a way that they yieldingly and comfortably strap him to his chair.

Studying the life history of single rainstorms, scientists have discovered that rainfall in a storm varies from spot to spot much more than was suspected.

New 6-Volt TRINDL Electric ARC WELDER

Works Off Any Storage Battery Or Ordinary Light Socket

This new electric arc welder is made possible by the invention of a low voltage carbon. Auto batteries may be used without removing from car. Uses about the same current as four headlight bulbs. Can be used on electric light socket by using a Trindl converter in place of battery. Broken parts are simply melted together by the white hot electric arc, in just a few seconds. Produces about 7,000 degrees heat.

RETAILS FOR $3.75 EA.

HOTTEST FLAME KNOWN

Melts iron and steel instantly. Welds fenders, radiators, holes in bodies, milk cans, tanks, brazes broken castings. Works on anything—iron, steel, brass, copper, tin or galvanized metal. Permanent repairs made almost for nothing. Used by factories in many operations. Positive money-back guarantee by a responsible firm. Act now!

AGENTS Men with cars to sell mechanics, repairmen, farmers, radio and battery shops, factories. Five-minute demonstration makes sales. **UP TO 150% PROFIT!** Write Today!

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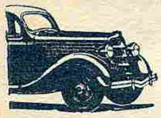
AGENTS UP TO $14 IN A DAY

Everybody needs food. My plan gives you opportunity for amazing profits at once. Make up to $14.00 in a day. I'll give you a New Ford Tudor Sedan as a bonus in addition to your cash earnings. No experience required. 250 Famous Products—all fast sellers. I send everything. You don't risk a penny. Write quick for Free Facts.

ALBERT MILLS
3946 Monmouth Ave., Cincinnati, O.



MAKE GLAZED CONCRETE PRODUCTS

NEW MONEY MAKING BUSINESS

Make beautiful, colored glaze finishes on concrete pottery, tiles, walls, novelties. New, perfected, low cost method. Make 2,500 designs of vases, jars, birdbaths, etc., without molds, power or costly tools. Use only sand and cement. No experience needed. Learn glazing, decorative waterproofing, pottery making, statuary casting. Earn money in you own business. Send 10c TODAY for booklet, color plates and complete information.

NATIONAL POTTERIES COMPANY
13 West 26th Street, Room 26
Minneapolis, Minnesota

37 MILES ON 1 GALLON OF GAS?

A wonderful improved auto gas economizer, which is self-regulating, has been recently brought out. Helps motorist cut gas and up-keep costs, and aids in reducing carbon and getting more power and pick up. Anyone can attach to any auto. Unusual money-saving proposition open for county or state sales distributors.

NEW IMPROVED GAS ECONOMIZER

SENT ON TRIAL

Pay Nothing if it does Not Save Gas

and help save auto running expense. Sample sent for trial at our risk. **Stransky Mfg. Co., G-600, Pukwana, S. Dak.** Send name and make car today—a 1c postcard will do.

REAL MONEY

Agents

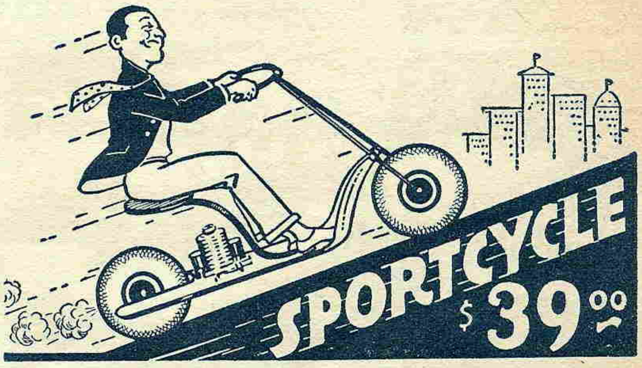
Sales Distributors

Startling Demonstrator. Astounds Motorists — convinces them. RISING GAS PRICES make sales easy. Get money-making plan and offer of NO-COST SAMPLE. Write quick —be first in your locality.

AMATEUR CARTOONISTS WIN $25.00

Wanted—Amateurs with humorous ideas. No drawing ability necessary. The amateurs of today are the professional cartoonists of tomorrow. Ideas judged and prizes awarded by Applause-O-Meter test before movie audiences. Everyone has an equal chance. 26 cash prizes in all. Rush name on penny post card for "Valuable Tips on How to Make Money With Simple Cartoons and Humorous Ideas". Cash Prize Entry Blank and Rules—SEND NO MONEY.

CARTOONISTS' EXCHANGE, Dept. 356-B, Pleasant Hill, Ohio



HERE IT IS—SPORTCYCLE, THE LATEST FORM OF SWIFT, ECONOMICAL, THRILLING TRANSPORTATION!—ONLY $39!

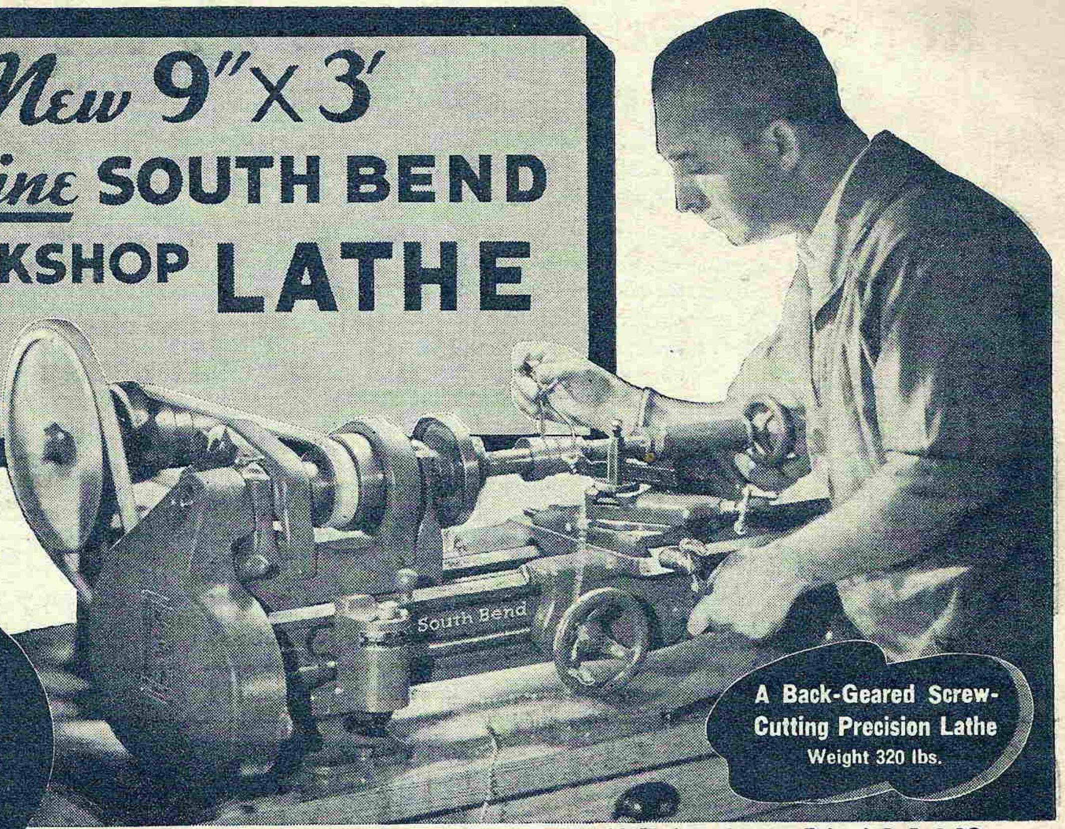
A light weight, easily handled, comfortable power-scooter. Has air-wheel tires, dural beam frame. A dependable, powerful air-cooled motor. Goes 30 miles per hour, climbs steep hills, makes 100 miles per gallon. Sportcycle takes you where you want to go at a cost of 1/5 cent per mile. To work—to school, for real fun—ride your own sportcycle. As much fun as a motorcycle—dependable as a car—safe as rail transportation. Cheapest power transportation known. Thousands will ride a sportcycle. Practical and enjoyable for men and women, girls, boys—8 to 80. Write now for illustrated folders and complete details.

SPORTCYCLE SALES
580 Market St. San Francisco, Calif.

Here is a golden opportunity for Agents. Many of your friends are prospects for a Sportcycle.

New 9" x 3' *Genuine* SOUTH BEND WORKSHOP LATHE

on NEW LOW TERMS



Lathe may be operated from any ordinary lamp socket

$85.00
Less Motor Drive

Terms as Low as
$6.00
A Month

A Back-Geared Screw-Cutting Precision Lathe
Weight 320 lbs.

No. 415-YA 9¼" swing by 3' bed Workshop Bench Lathe with Horizontal Motor Drive, ¼ h.p. Reversing Motor, Switch and belt tension countershaft as shown above.......... **$116.00**
($15.00 Down, $6.00 a month for 18 months)

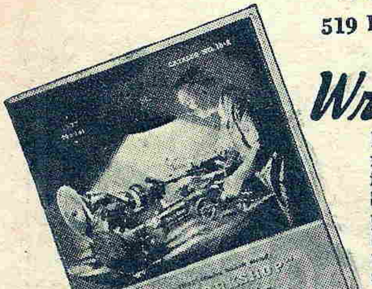
THE new 1937 model 9-inch Workshop Precision Lathe is a back-geared Screw Cutting Lathe and is recommended for the finest, most accurate jobs in manufacturing—in the tool room, in home workshops and automotive machine shops. Workmanship and materials used are exactly the same as used in more expensive models of larger size, making it represent the greatest value we have ever offered in 31 years of fine lathe building.

Features include Twin Gear Reverse to lead screw, Ball Thrust Bearing on Spindle, Longitudinal Screw Feed to Carriage, Precision Lead Screw for Cutting screw threads—and scores of other important features. Takes 38 practical attachments for milling, grinding, draw-in collet chuck work, and many other manufacturing jobs.

South Bend Lathe Works
519 E. Madison St., South Bend, Ind., U.S.A.

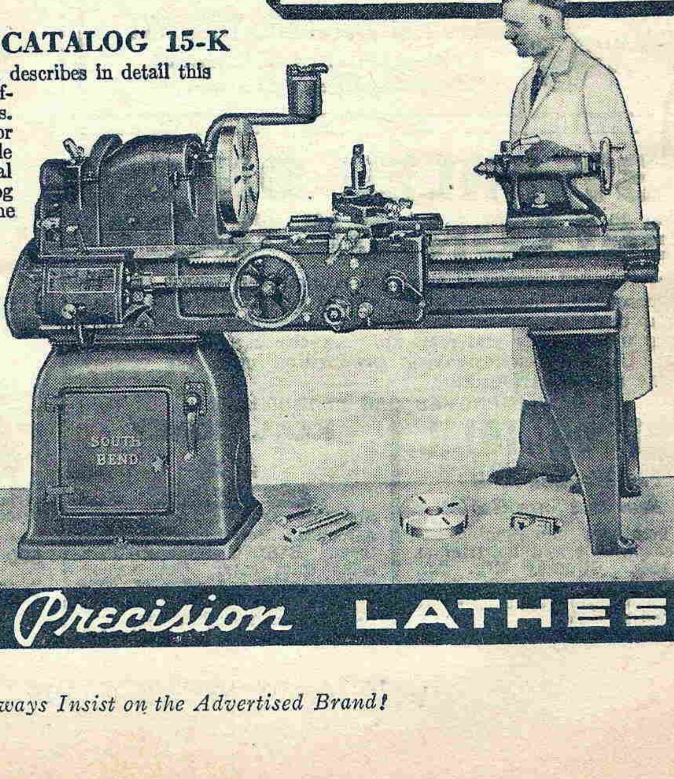
5 OTHER SIZES: 9", 11", 13", 15" and 16" SWING IN ALL BED LENGTHS
PRICED $97 to $1200

Lathe shown below is No. 117-C 16" x 6' Quick Change Gear Underneath Belt Motor Driven Lathe with 1 h.p. motor. Complete as shown. Weight 2300 lbs........... **$869**
($87.00 Down, $38.50 Monthly for 22 Months)



Write FOR NEW CATALOG 15-K

New catalog illustrates and describes in detail this new Workshop Lathe in 8 different drives, 4 bed lengths. Shows the 38 attachments for use with this lathe. A valuable book for all interested in metal working lathes. This catalog **sent free, postpaid.** Use the coupon shown below.



South Bend Lathe Works,
519 E. Madison St.,
South Bend, Ind., U. S. A.

Please send the following free, postpaid:
- ☐ 9" Workshop Lathe Catalog No. 15-K.
- ☐ General Catalog No. 96.

Class of work ....

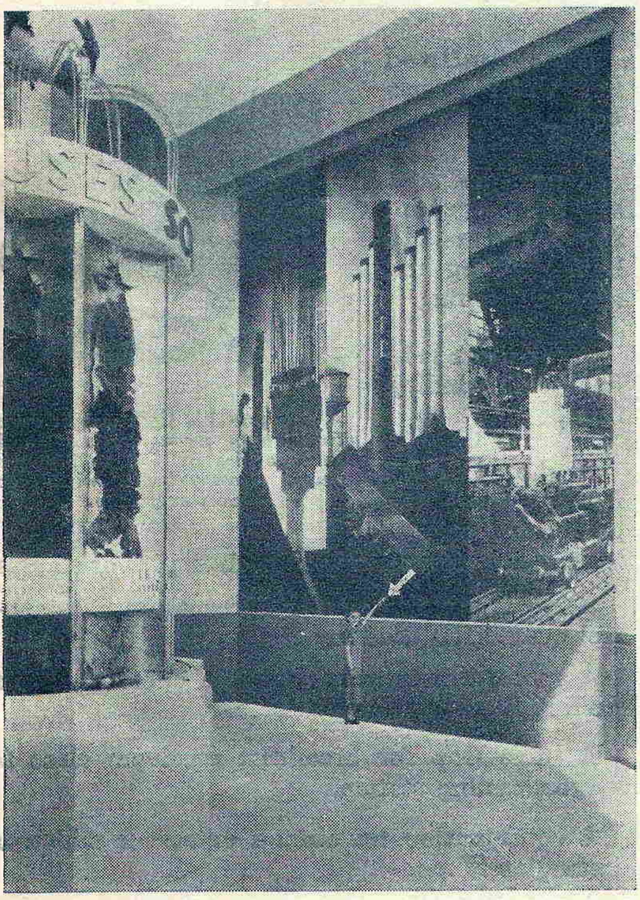
Name ....

Address ....

City.............................. State...............

SOUTH BEND *Precision* LATHES

Largest Photo Murals At Florida Exhibit



Tremendous in size, these spectacular photo murals were enlarged to a height of 23 ft. 9 in. from an original negative having a total area of only 3 1/2 sq. in. The arrow points to the tiny photo, held by the girl in the foreground, from which murals were made.

GIANT photo murals, the largest ever made from an actual negative film, have recently been installed in the Ford exhibit at Miami, Florida. The murals, which depict scenes taken at the Dearborn plants of the Ford company, were originally photographed with an ordinary camera and huge enlargements made from the small negatives.

To produce the murals, large sheets of paper were first treated with photo-sensitive solutions in a darkened room and allowed to dry. The small negative film was then inserted in a special enlarging device and projected on the chemically treated sheets. Photography experts then developed the giant enlargements and cemented them on large panels of wallboard for mounting on the walls of the exhibition building.

Some woodpeckers live in the desert, where they have only the giant cactus to peck.

The great majority of wild fowl found in the United States were bred to the north in Canada.

This MACHINISTS' Home-Study Course helps men get ahead

Newly assembled—specially priced—these five recent books give you the practical facts on modern machines, up-to-date methods you need to advance in machine shop work. Take advantage of the other man's experience as found in books, to solve your problems, increase your efficiency, with the new

Library of Modern Machine Shop Practice

5 volumes—2000 pages—1600 Illustrations

(A combined home-study course and reference library)

This library of machine shop practice was written for practical men. It gives you the best methods for every kind of machine shop work. It deals fully with lathes, drills, and other machine tools and their operation, automatic screw machines, speeds and feeds, gear design and production, punch and die work, metal finishing, etc., etc. Plainly written—completely illustrated—the best kind of help to the machine-shop man who wants to advance himself.

No money down—special price—easy payments

FREE EXAMINATION COUPON

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Send me for 10 days' free examination the Library of MODERN MACHINE SHOP PRACTICE. If satisfactory I will send $1.50 in 10 days and $3 monthly until the special price of $16.50 is paid. If not wanted, I will return the books postpaid. (To insure prompt shipment write plainly and fill in all lines.)

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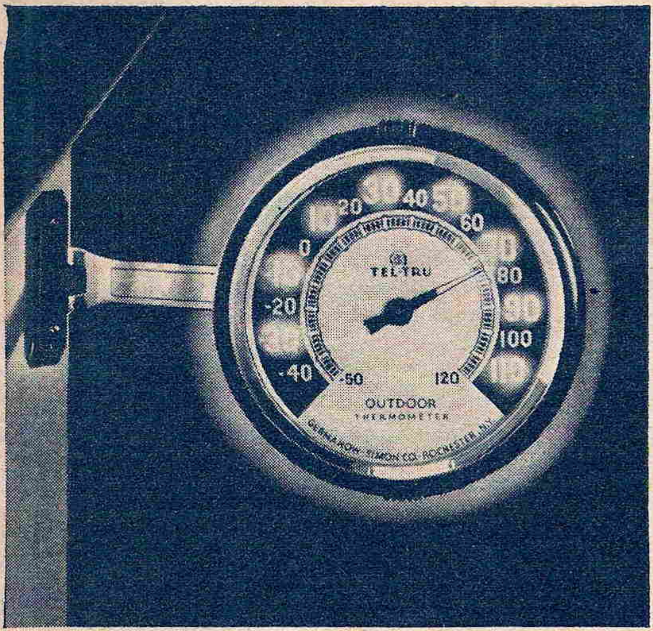
GAS MOTORS *Ready-to-Run*

$12.50

The thrill of a lifetime is yours this Spring with a G. H. Q. superpower gas engine—actually one of the most powerful motors ever constructed! Never in the history of gas engines was a motor ever offered at so low a price. All America has acclaimed this engineering triumph—accomplished by outstanding G. H. Q. designers and engineers after years of exhaustive, scientific, aerodynamic research. Has broken records for amazing performance. Flies model planes up to 10 ft. wing spread. Also used for boats. And look at all these extra features! Easy starting—just a twist of the wrist. Steady running—runs 27 minutes on ounce of gas. Precision, replaceable parts, Cylinder and Piston Lapped. Longest crank shaft ever made on miniature motor. Chrome nickel steel shaft with 1 1/8" bearing surface. Connecting rod of high speed bronze. 1/5 horse power at 3000 to 7000 R.P.M. This famous motor complete, entirely assembled on a stand. Tested and run before shipment—performance guaranteed. No oil, gas or batteries included. Only $12.50. **FREE**—one finished fly-wheel mounted on motor. (This offer not for dealers). Send 3c for illustrated catalogue including information on gas accessories.

G. H. Q. MODEL AIRPLANE CO.
854-A East 149th St. New York, N. Y.

Expanding Business Greets New Ideas



A new outdoor thermometer features large easy reading numerals and pointer covered with radium paint. The case is four inches in diameter and is mounted on a swivel. Numbers measure one-quarter inch in height. Crystal is unbreakable.

A ski and toboggan carrier for attachment to automobiles.

A radiant heater for installation on cars to make easy starting possible on cold mornings.

A portable electric sanding and rubbing machine.

An abrasive mask to be used for the protection of operators in sand blasting work.

A protective covering for cuts, blisters, abrasions and other small wounds, allows free play with every joint motion, adheres firmly and is water resistant.

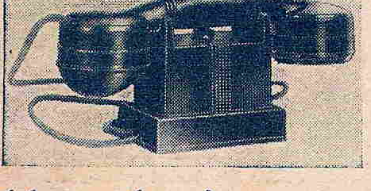
A steel hatch cover locks under pressure onto ordinary hatch coamings.

A streamlined neon tube transformer for window display use.

A low priced balance of great accuracy weighs up to 100 grams and has sensitivity of 1/100 of a gram.

A hermetically sealed wire wound metal clad resistor.

A booklet listing inspected household electrical supplies.

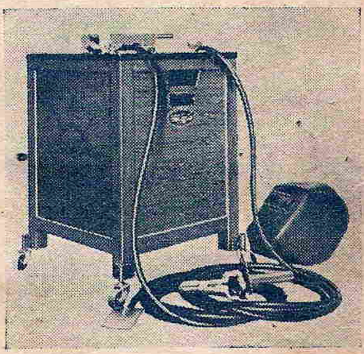


A buzzer and transformer are contained in the housing of this modernistic hand telephone and stand. Several may be used on one circuit.

A streamlined hot water heater boiler.

A pre-designed air duct system for automatic home heating and air conditioning.

A concentric field coil winding head.



A new portable light weight transformer type arc welder is available in capacities of 130 to 300 amperes. Rotary knife switch controls amperage.

A device to fasten papers together by crimping instead of by using paper clips, pins or staples.

A low frequency carrier current provides control over lights used for display.

A motor-driven wire stripper operates either from right to left or vice versa.

A wave trap for broadcast receivers close to a broadcasting station.

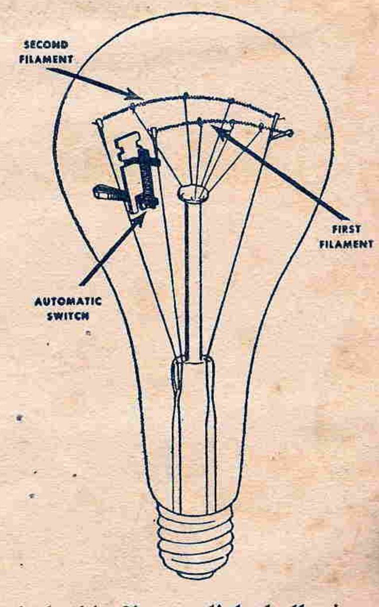
A combination tea wagon or server which is immediately convertable to luncheon or bridge table.

Unit air conditioners with a wide range of air and refrigeration capacities.

A low-priced vacuum-hydraulic brake kit for trucks and buses.

A self-contained fresh water cooling system with a heat transfer device for auto engines converted to marine type.

A tubular all steel upward acting garage door.



A double filament light bulb gives double length of service. When one burns out, a switch automatically connects second filament in circuit.

Editor's Note—Addresses of manufacturers of these and other new products in this issue can be obtained by sending a stamped, self-addressed envelope to Modern Mechanix Publishing Co., Information Bureau, Fawcett Building, Greenwich, Connecticut. Manufacturers are invited to submit material for publication on this page.

HERE'S ALL IT TAKES *to get full engine power as you stop wasteful "knock"*

Just two easy steps bring you all the economy and performance offered by modern high compression cars...

1. (*Below*) Practically all modern high compression cars have an adjustable spark for the octane (anti-knock) quality of the fuel used. "Knock" *can* be eliminated by retarding the spark, but the result is loss of power, sluggishness, danger of overheating and waste of gas and oil. To take full advantage of your high compression engine, have your car dealer adjust the spark for *maximum* performance. It takes only a minute or two, and then . . .

CONTAINS LEAD
ETHYL

2. (*Above*) Use Ethyl! Your high compression engine, with its spark properly adjusted for maximum performance and with Ethyl in the tank, will give you the fast acceleration and the generous reserve of power it was meant to give. Ethyl is at least six octane numbers higher in anti-knock value than any regular-grade gasoline—and what a difference that extra anti-knock value makes in the engines of modern high compression cars!

Here's the EXTRA value you get at the ETHYL pump:

1. You get more anti-knock fluid (containing lead tetraethyl) at pumps marked "Ethyl" than you get in the best regular-grade gasoline.
2. You get the all-round quality (including quick starting) that is *double-tested* by the oil company and by the Ethyl Gasoline Corporation.
3. You get 100% performance from your high compression engine.
4. You save on oil as well as gas by preventing overheating.

NEXT TIME GET ETHYL . . .
A BETTER RUN FOR YOUR MONEY

ETHYL
ETHYL GASOLINE CORPORATION

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IN
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Your cigarette line reads... They Satisfy
Chesterfield
CIGARETTES
LIGGETT & MYERS TOBACCO CO.
CHESTERFIELD
And there's a wealth of good taste in store for you

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